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THE

CHOLERA ASPHYXIA

OF NEW-YORK.

LETTERS

ON THE

CHOLERA ASPHYXIA,

AS IT HAS APPEARED

IN THE CITY OF NEW-YORK:

ADDRESSED TO JOHN C. WARREN, M. D., OF BOSTON, AND ORIGINALLY PUBLISHED IN THAT CITY.

TOGETHER WITH

OTHER LETTERS, NOT BEFORE PUBLISHED.

BY MARTYN PAINE, M. D.

New-York:
PUBLISHED BY COLLINS & HANNAY.
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1832.

ENTERED according to the Act of Congress, in the year one thousand eight hundred and thirty-two, by COLLINS & HANNAY, in the Clerk's Office of the District Court of the United States, for the Southern District of New-York.

TO THE READER.

WHEN I addressed the first of the following Letters to the distinguished gentleman with whom I prepared for my profession, I was influenced principally by the desire, so natural and common to pupils, to repay by every means in their power, and if possible, however slightly, in kind, the unlimited debt which they owe to their instructers. The early appearance of the Cholera in New-York, a disease before unknown in our country, afforded an opportunity for the humblest among us, to communicate information which might be interesting, and perhaps useful, to the most skilful and learned and eminent in other cities. And I could not but apprehend, that this inscrutable and relentless stranger would, in his arbitrary and fearful progress, visit Boston, where I have many friendships and near attachments. The little therefore that I could, by diligent observation, learn of the Cholera, I was irresistibly impelled to communicate to one to whom all in that city look for professional aid

or instruction. But I had not the most distant expectation, that my letters would meet the public eye, nor would my own judgment have led to their publication. I will not, however, deny the gratification I felt, at learning that their publication had been deemed useful by one, whose approbation I have ever wished to deserve. The first four letters appeared originally in the Boston Daily Advertiser and Patriot, and in the Boston Weekly Messenger and Massachusetts Journal, and it was not until after they had been published in those papers, that the idea was suggested to me of offering them to the public in their present form. As soon as I had adopted this suggestion, I thought it would be better to reserve the remainder of the letters, until the whole should be published together, and the fifth and sixth letters are accordingly now for the first time presented to the public.

I am sensible that these letters can possess no other value than such as they derive from my means of observation, and the diligence with which they have been improved. I ought, therefore, to say, that from the first appearance of the disease in this city I have sought it at all times and in all places, and indeed much more constantly than was consistent with my health, and ordinary engagements. In connexion with two medical friends, I made, on the second of July, a minute post mortem examination of two of the first who fell victims to the

disease, and which were the two first dissections made in the United States. These examinations are fully described in the seventh letter, which was originally published in the New-England Medical and Surgical Journal. Since then, besides my own private practice, I have daily visited as many of the hospitals as my engagements would admit of, and have made and witnessed numerous dissections. To have described these various post mortem examinations would have been an unnecessary repetition of similar appearances. I have thought it worth while to preserve only such cases as would exhibit the several varieties of symptoms which have passed under my observation. These will be found in the eighth, ninth and tenth letters, which have also been published in the Medical Journal. One of these also announces the important discovery by Dr. Gale, a scientific chemist of this city, of oil existing in a free state in the blood of Cholera subjects.

The letters, except those describing the dissections, are printed in the order in which they were written. The parts of the subject of which they treat cannot, therefore, be expected to be formally or methodically arranged. Each letter was however designed to embrace a single topic. The first presents a general view of the disease; the second relates to the nature and treatment of premonitory symptoms; the third to the importance

of attention to food, as a means of prevention; the fourth to the treatment of Asphyxiated Cholera; the fifth to the nature and philosophy of the disease; and the sixth gives a circumstantial account of its symptoms as they appeared in this city. The other letters contain the dissections.

I trust I need not apologize for those occasional repetitions and other faults, which are almost incident to letter writing. But I cannot but regret, that the more impaired condition of my health has unfitted me for the task of completing the letters as I wished to have done, and forbade any thing like the revisal and correction which they required. Less than this I could not, and more I need not say, to a candid public.

New-York, *September* 14*th*, 1832.

LETTER I.

New-York, *August 10th*, 1832.

Dear Sir,

I had intended to have earlier acknowledged your very flattering attentions, and to have expressed the interest and instruction with which I perused the Report of the Massachusetts Medical Society; which, although purporting to express the opinions of others, is undoubtedly one of the best original essays which has appeared on the subject of Cholera Asphyxia. This delay, however, enables me to add a few words in relation to the disease as it has appeared in this city, which I do, not from their novelty, but to show you how Nature and Art have still travelled the beaten path.

The Cholera Asphyxia has presented to our observation the same combination of phenomena that has distinguished the Epidemic in other quarters of the globe; and when the varieties of constitutions, the differences in habits, sex, age, &c. are duly considered, the symptoms are remarkably uniform, particularly after asphyxia has supervened. The disease has been less malignant here than at Montreal and at Paris, which is probably to be ascribed to the better ventilation and greater cleanliness of our city; for your own observation

will yet assure you, that the disease, at least in cities, requires for its production the co-operation of local miasmata with the general epidemic poison; and doubtless the same local developements give intensity to the poison wherever it prevails. Well favoured cities, therefore, with spacious streets, and especially where a proper attention is paid to the cleanliness of yards, houses, &c., and in which a crowded population is not permitted during the visitation of the Epidemic,' may expect to reap a rich reward from measures that are so clearly dictated by experience and philosophy. In New-York we may be said rather to have suffered several endemics than a general epidemic. The epidemic poison has not been sufficiently active to produce a full predisposition to the disease, without the co-operation of local causes. It has been confined to the malarious part of the town, and generally to such houses as are small and crowded with inhabitants,—in some instances not less than a dozen in one house having died in rapid succession.

Although we may recognise in a very striking degree the phenomena of the Asiatic disease, they are more or less distinct in different subjects; each case, however, presenting nearly the same combination. The symptoms most liable to modification, are lividness and collapse of the features, these being more frequently absent than has been remarked in other countries. Asphyxia, or nearly so, is a uniform symptom of the stage of collapse; so also are the unequal distribution

of heat, vomiting and purging,—almost invariably of a fluid resembling rice water,—very generally spasms, cold sweat, corrugated skin and blueness of the fingers, cold tongue, cold breath, suppression of the glandular secretions, &c.

The morbid appearances on dissection have been less uniform than the symptoms, and our pathology has been consequently much embarrassed. The small intestines commonly exhibit some appearances of congestion either of the mucous or serous coat, generally of the former; the large intestines commonly blanched, especially if the diarrhœa has been profuse; the stomach nearly natural; liver sometimes greatly injected, but often very natural; kidneys, spleen, and pancreas natural; bladder empty and generally contracted. The gall bladder contains from one to two ounces of black, green or yellow bile. There is generally, though not always, an absence of this fluid in the intestines, which usually contain a substance similar to that evacuated during life. It has been well compared to rice water, with flocculent matter, which is soon deposited. The texture of the small intestines, particularly, is often softened, which has induced some physicians to ascribe this result to a violent inflammation of these organs, and to regard this action as the proximate cause of the disease. But so far as symptoms and appearances, that usually denote inflammation, are necessary to this theory, they are certainly nearly wanting in Cholera Asphyxia,—venous congestion being almost the

only sensible condition of the blood-vessels. Both cavities of the heart are sometimes filled with black blood, and they are sometimes empty, —appearances which also attend the lungs. The brain is more uniformly injected than any other organ, and usually contains, either in the ventricles, or within its membranes, a preternatural quantity of serum; yet the integrity of the mind is not much impaired. The veins of the spinal sheath are also commonly full.

Here, as every where else, the disease was most malignant at its irruption, and has become milder as the epidemic air has abated. Most of the subjects perished, at first; and our greater success, now, arises from the milder condition of the disease, from a longer duration of the premonitory symptoms, and from the more susceptible class having been swept away. The nature and treatment of the epidemic are probably no better understood than when it first invaded Europe. The Asiatic physicians appear to have exhausted the subject, and the more we have departed from their modes of treatment, the less successful have been the results. It is certain that the disease was less fatal in Asia, where it is supposed to have been most malignant; and it has been destructive in an increasing ratio ever since it appeared in Europe. At Quebec and at Montreal scarcely any recover, at this late period, after the accession of Asphyxia. Here the disease having been milder, the recoveries, after that stage, have probably been about one in six. If the habits of

the patient have been regular and temperate, perhaps it is one to four or five that he will recover, if asphyxia have not existed more than one hour; but no such good fortune awaits the intemperate. The noise which he hears is his funeral knell.

I have not remarked that changes of temperature or atmospheric phenomena, have exerted much influence on the character of the epidemic. It seems to have been governed by its peculiar laws, which have been scarcely modified by accident. The irruption took place when the weather was delightfully serene, and the city most remarkably exempt from disease. Diarrhœa had not even preceded it; and it was an astonishing spectacle to witness the work of the destroyer without the usual admonitions of his approach. It was then that we had *Death* and not *disease* in our city. His march was rapid, under a cloudless sky and a most genial temperature; and the mortality acquired its maximum during this seemingly auspicious state of the atmosphere. There then began a decreasing ratio, the weather and temperature becoming more variable, and the present storm, which has continued a week, seems not to have retarded its decline in the city; while in the neighbouring country the disease is appearing most malignantly under the same conditions of the atmosphere.

What are the exciting causes? It has been very rare, if it has ever happened in this city, that the epidemic poison has done more than

have no difficulty with the disease in its preliminary stages; but after asphyxia has fairly supervened, I do not believe that one patient in six is restored by any process, whatever may have been asserted on this subject. I have seen much of the disease, and have looked at it impartially; and I express a solemn conviction on the subject of its fatality. I have seen every method tried, and in some I have no confidence at all. I have none in what has been denominated the *camphor treatment*, exclusively; none in the *exclusive* use of ice internally. I have seen the best results from powerful external stimulants;—calomel more or less modified by small quantities of opium, according to the irritability of the mucous membrane, and camphor is a useful addition if spasms be present; friction with camphor, or applications of ice for the relief of spasm; stimulants moderately to sustain the sinking powers, of which ammonia seems the best. The irritability of the mucous membrane is easily allayed, and is very rarely an obstinate symptom,—the most prominent, during the stage of asphyxia, being the absence of pulse, unequal distribution of heat, restlessness and altered expression of countenance. We have nearly abandoned transfusion, from its almost uniform failure. The recoveries I do not think have been in the ratio of two to fifty. The temporary effect is very encouraging, but the patients soon die. Our best practitioners employ calomel in large and small doses, some preferring 15 to 25 grains once in three or four hours, and

others five grains every hour. I have seen no good effect from blood-letting in any instance after asphyxia; but this may have arisen from the quantity having been small, and the difficulty with which it is invariably abstracted. From the pathology of the disease, and the experience of the Asiatic physicians, I have been in favour of the remedy.

I regret that my time will not permit me to add more at present. Your citizens ought to be well informed of the fatality of the disease after the stage of asphyxia, and of its mildness before that stage supervenes, that they may be early induced to attend to the premonitory symptoms.

Very respectfully, &c.

LETTER II.

NEW-YORK, *August 18th*, 1832.

DEAR SIR,

I HAD yesterday the pleasure of receiving your favour of the 15th inst., and I was certainly agreeably surprised, that my remarks on the subject of Cholera Asphyxia should have afforded you the interest you do me the honour to express, and more particularly that you considered them worthy of publication. In relation to your inquiries respecting the symptoms which have marked the accession of the Cholera in this city, there exists here, as in other countries, the remarkable fact, that the earliest manifestations of disease are almost uniformly mild, and bear no corresponding ratio to the tremendous developement which suddenly succeeds after a certain duration of that premonitory stage. This introductory stage is very rarely wanting, and its duration and symptoms depend much on temperament and habits. The symptoms generally denote some impaired function of the digestive organs, and usually consist of diarrhœa, frequently connected with nausea and vomiting. This condition in many instances is preceded by constipation, which, however, is not so uniform as has been imagined, but which, if neglected, is very liable to result in diarrhœa. There

is, indeed, a general tendency to looseness of the bowels, and they, who have been habitually compelled to employ some laxative medicine, find now an ample substitute in the epidemic influence. This is a fact, which, I think, cannot be too well understood; for it is this impaired state of the digestive organs, this tendency in all to looseness and diarrhœa, which have rendered our precautions in relation to food so indispensable, and which, when disregarded, have taught a lesson of prudence that few would have heeded, but for the terrible penalty so evidently connected with the indulgence. If the habits of the patient have been prudent, especially in respect to food, the diarrhœa is moderate, continuing, if it terminate in malignant cholera, for many days without vomiting, and not productive of much prostration or distress, till collapse suddenly supervenes. If indigestible food be the exciting cause in a temperate subject strongly predisposed, vomiting is an early symptom; which, however subsides, and there only remains for a while, the diarrhœa, afterwards maintained by slighter errors in diet, till it sooner results in Asphyxia than in more abstemious subjects. I have not observed that constitutions impaired by disease, where great prudence has been practised, are more obnoxious to cholera, or that collapse sooner succeeds the premonitory stage than in the robust. Particular circumstances have led me to attend closely to this fact, and my observations on this subject do not concur with book authority. But it is equally true that constitutions,

impaired by intemperance and prostitution, are peculiarly the subjects of this pestilence; and I cannot agree with Mr. Fife of Gateshead, "that drunkenness is not a powerful predisposing cause," though doubtless very much is to be ascribed to the influence of other accidental causes,—particularly excesses in food, and the filth in which they riot. The succession of primary symptoms is more rapid in such instances; but still there is commonly a period for the successful intervention of art, but which is generally neglected. The aged sink quickly under the diarrhœa, if the choleric predisposition exist; and children, though not often attacked, pass rapidly through the several stages of the disease to a fatal termination. Diarrhœa and vomiting do not always distinguish the premonitory stage; but it is sometimes denoted only by headach, loss of appetite, oppression at the chest, &c. and again spasms are known to have been the earliest symptom, and at first the only prominent one, and susceptible of relief. During the existence of diarrhœa, the appetite often remains unimpaired, and I have frequently known it to have been morbidly increased just before the occurrence of that symptom, and the patients have sunken rapidly into an incurable asphyxia. Something, no doubt, is to be ascribed in such instances, in explaining the accelerated march of the disease, to the morbid indulgence.

Much may be said on this very interesting subject of premonitory symptoms, on which are suspended the life of the patient and the happiness

of friends, and which may determine the fate of both, as they may be duly noticed or disregarded. It is certain, however, that it is not one of the least attendant phenomena, that the patient, whose fears had been before sensitive on the subject of the epidemic, becomes seemingly indifferent after the invasion of the earliest stage, and is wholly regardless of life when he approaches the more alarming crisis. This apparent apathy has been ascribed, you are aware, to a disinclination to avow the apprehension, that the king of terrors has at length made his approach where most dreaded; but I cannot think that the true cause has been assigned. It is a symptom *belonging to the disease*, and I have frequently experienced a great difficulty in exciting the fears of intelligent patients so far as to induce them to submit to the necessary remedies and a proper abstinence from food. It is a condition of the mind, also, which is *progressive with the disease*, and I have rarely heard of the least solicitude being manifested, after the formidable stage has supervened.

The premonitory symptoms, here as elsewhere, were of comparatively short duration at the irruption of the epidemic, at which time death ensued in a few hours after the attack.

The treatment of this epidemic, in its incipient stage, must, of course, be determined by the particular symptoms of the case, the probable strength of the predisposition, general circumstances of the patient, &c. From the impaired condition of the digestive functions, it is indispensable in all cases

to discontinue solid food, and to limit the quantity of farinaceous fluids.

1st. If the subject be of temperate habits, the tongue clean or slightly coated, the evacuations not particularly morbid nor frequent, and no vomiting, it will be generally sufficient to stop the solid food; or a small dose of castor oil, or of rhubarb and magnesia, will be all the medicine that will be indicated. If the diarrhœa be more urgent, denoting a more irritable state of the mucous membrane, probably two teaspoonsful of paregoric should be at once given, and another after each subsequent evacuation. A continued abstinence from solid food for a short time will supersede the necessity of a cathartic, where the bowels have been so thoroughly evacuated as a consequence of disease. The irritability of the mucous membrane is easily allayed at almost every period, and vomiting and purging arrested without much difficulty; and I have found paregoric the best remedy for that purpose when these symptoms are not violent.

2d. The next most simple combination of premonitory symptoms proceeds from some *error in food*, the most common of all exciting causes. If there exist much nausea, or imperfect vomiting, and the food have not evidently passed from the stomach, the patient will be immediately relieved by a mild emetic of ipecacuanha, associated with calomel enough to act as a cathartic. The organs of digestion are thus unloaded, and the predisposition to disease at once subdued. The patient should be afterwards restricted to broth or gruel, till the symptoms shall have been absent for a day or two.

If a patient, who has thus erred, be not seen till the contents of the stomach have been ejected, or have passed into the bowels, emetics are not indicated, for we have seen no benefit arising from them, except at the very invasion, and for the purpose of evacuating the stomach. At later periods they are nearly sure to kill. If the diarrhœa be now only moderate, and the evacuations not presenting the characteristic appearance of malignancy, and the vomiting have ceased, a dose of rhubarb and magnesia will probably suffice. But if vomiting continue with obstinacy, a stronger predisposition is shown, and calomel modified by a grain or less of opium and one or two grains of camphor, is indicated; and if the discharges be not soon arrested, more opium should be given, and the calomel repeated once or twice if the secretious have appeared morbid, till the bowels are again moved. Or, when I think I have obtained a sufficient advantage from the specific action of that remedy, and it has not produced a cathartic effect, I suspend its exhibition and await that result for some hours; or, if there be any motive for an early movement of the bowels, I exhibit a dose of castor oil. It frequently happens that the direct operation of a cathartic, at the very invasion of the disease, will alone arrest its progress; but after a delay of a few hours, the mucous membrane may have acquired a degree of irritability that must essentially modify the practice.

The quantity of calomel which I exhibit at a

dose in the premonitory stages varies from 10 to 25 grains,—generally about 20 grains. But I have observed a great difference in the action of calomel and other cathartics in the diseases of Boston and Montreal and those of this climate. Here we are more subject to congestive affections of the liver and the abdominal viscera, and more active doses are more advantageously employed than at the former places.

3d. If diarrhœa suddenly invade, and be soon followed by vomiting, without any obvious cause, and if the evacuations be serous, and resembling or approaching in appearance to rice water, the attack has arisen from the activity of the predisposing cause, and constitutes a formidable case. Here there has probably been a gradual accession of disease, but not denoted by any remarkable symptoms, till this sudden developement of diarrhœa and vomiting. In such a case the tongue may be clean, and scarcely any other morbid phenomena than the intestinal commotion and the serous evacuations to admonish us of the impending danger. If the pulse be not much depressed, this is a case for blood-letting, and perhaps for its repetition. At the same moment a grain of opium should be given, and repeated once in 20 to 60 minutes, till the irritability of the mucous membrane be subdued. A large mustard cataplasm should be also applied over the region of the stomach and liver, and as soon as the skin is irritated by that means, a large blister should be substituted. Among the

early remedies, calomel should not be neglected, and conjoined with opium and camphor if the vomiting and purging continue; and it will be commonly found expedient to repeat the calomel for two or three large and successive doses. The evacuations will become very dark as the disease subsides. His convalescence will be gradual.

4th. If the patient exhibit a white tongue, and diarrhœa be almost the only other attendant symptom, he will probably be relieved by calomel alone. He will require particular prudence, however, in regard to food. If a sense of oppression at the chest exist, or pain in the head, or soreness at the region of the stomach, blood-letting will be indicated; and if tenderness of the stomach remain, a blister or leeches applied there will accelerate his cure.

5th. It sometimes happens that the earliest symptoms consist of headach, oppression of the præcordia, impaired appetite, and coated tongue. Blood-letting and cathartics of calomel are then required, and a blister over the region of the stomach. In these cases, where there has been no diarrhœa, the first evacuation will be very dark.

6th. If there be a yellow coating of the tongue, and purging of bilious fluid, with or without vomiting, the case is a favourable one, whatever the exciting cause, and requires cathartics of calomel and oil. I have, however, seen such cases result in asphyxia, and terminate in death, the pa-

tient purging and vomiting a deep yellow or a deep greenish-yellow bile to the last moment.

7th. Spasms sometimes introduce the disease, and may exist for some hours, unattended by any other prominent symptom. They have not, however, I believe, constituted a difficult case, but have soon yielded to blood-letting and cathartics. They sometimes also occur in connexion with the premonitory symptoms of diarrhœa, and require, with other means I have indicated, stimulating embrocations, friction, &c. The topical application of ice is also excellent for the relief of spasm, whether in the premonitory or the subsequent stages of the disease.

8th. There is occasionally, from the access of the disease, a very obstinate determination of blood to the head, and palpable inflammation of the brain. In such instances the evacuations in the primary stage are very light, or do not occur at all. These cases require decision with the lancet, leeches to the head, removal of the hair, and cathartics of calomel and castor oil. The dejections become, at once, very dark, and frequent cathartics will be necessary in the progress of the cure. These cases almost always yield to this treatment. When they do not, or are neglected, vomiting and purging of the characteristic rice water takes place, and the patient passes through the stage of collapse into a state of delirium.

Whenever vomiting occurs as a premonitory symptom, all fluids should be denied the patient. If it do not readily yield to the treatment sug-

gested, ice held in the mouth will be found a useful auxiliary, and it affords the advantage, also, of allaying the intolerable thirst which is sometimes early attendant on that symptom.

If the symptoms denote a severe grade of disease, salivation will hasten convalescence, and obviate the necessity of some other remedies.

Although the predisposition to this epidemic is generally developed by some of the premonitory symptoms which I have indicated, it occasionally happens that the attack is very insidious. The tongue may be clean, and of a healthy appearance: the evacuations at first bilious, and unattended with pain; perhaps little or no vomiting and no evidence of danger in the countenance; yet I have known a sudden transition of these auspicious appearances to an array of the most malignant symptoms.

I have said but little in respect to the state of the tongue as an index of the disease, and still less of the pulse, and skin, and secretion of urine. They are so variously affected, under apparently the same circumstances, that they cannot be assumed as criteria. The tact of the physician, therefore, must convert them to the best advantage in each individual case.

The patient will require particular instructions in regard to food during his convalescence, as he will be very likely to yield to his propensities.

I regret that my time will not allow me to reply fully to your letter, but I will drop you another line this evening, and communicate, also, the results of some analyses of the blood.

In reply to your inquiry, I have had no symptoms of the Cholera, and the physicians here have been generally equally exempt. The few that have died perished in the good cause of humanity, and were the victims of a generous ambition, that prompted them to exposures which no constitution can resist.

Very respectfully, &c.

LETTER III.*

NEW-YORK, *August 19th*, 1832.

DEAR SIR,

IN my letter to you yesterday, explaining the results of my experience in the treatment of the premonitory symptoms of Cholera Asphyxia, I had not the time to say what I could have desired on the no less important subject of the *exciting causes* of the disease. Having, however, adverted in a former communication to the ge-

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* This letter was introduced by the original publisher with the following remarks, and which are retained for obvious reasons. I need not say that I entirely concur in the opinion expressed on the subject of food.

"The author of this and two other able letters on the same subject appears to disapprove the use of fruits and vegetables during the Cholera season.

"On this opinion it may be remarked, that a distinction should be made between a place where Cholera is epidemic, and one where it is expected to be epidemic.

"Where the epidemic exists no one should eat fruit and vegetables, unless the state of the digestive organs require these articles, and then with all possible precaution as to quantity and observation of the effect produced.

"Where the Cholera does not prevail, the constitution of the atmosphere, although predisposing to the epidemic, need not prevent a prudent use of ripe fruits and good vegetables."

neral facts, relating to this inquiry, which have occurred under my observation, I shall now confine my remarks to the most common of all the exciting causes of Cholera. It is an argument, *à priori*, that the varieties of food and the moderate stimulants, which are well adapted to the healthy system in ordinary conditions of the atmosphere, can scarcely endanger the health of the being they were destined to nourish, under any vicissitudes of the natural phenomena of the elements. This very plausible induction has operated in most places that have been visited by Cholera, and the general sentiment has been in favour of a moderate indulgence in the fruits of the earth, and the luxuries of the culinary art. The irruption of the Epidemic, however, soon proved to us the fallacy of this philosophy, and the experience of the majority has been conclusive against many species of food, which they had hitherto eaten with advantage. The fact has been even appalling to the most incredulous epicure, who has been compelled to drop his accustomed varieties, as they have been returned, one after another, from his stomach undigested; or if perchance this organ have borne the indulgence with its wonted forbearance, an unusual tormina of his bowels has startled his confidence in the vigour of his digestive powers. Theory and experience all give way to the overwhelming argument of a choleric atmosphere. The constipated dyspeptic abandons his bolus of soap and aloes, and condemns unbolted flour as a

purgative diet; and even the shampooing of Halsted threatens him with hyper-catharsis. The doctors, who tickle the palates of their patients, are thrown into confusion, and some are alarmed lest it should lend a fact to another class, who regard the subject of food as an important part of the methodus medendi in diseases of the digestive organs. The epidemic influence, however, cannot be resisted, and there soon prevails a remarkable unanimity in regard to the impaired condition of the digestive functions, and the necessity of abstinence from many common articles of food. In short, there is an *internal impression* produced on every one, which admonishes him that he is more than usually vulnerable. The epidemic poison creates, almost universally, an irritable state of the stomach and bowels, of which very few are aware without an experiment, but, which is, however, commonly made; and the issue will depend on the extent of the indulgence. Even the habitual drunkard glides safely along by abstaining from his accustomed liquor, and observing a rigorous diet; and it has been constantly observed that in those subjects, the immediate exciting cause has been rather some indigestible food, than the inebriating poison. It is undoubtedly important to obviate constipation; but this is rarely a difficulty in cholera times, and should be done by medicine rather than by food. The former, judiciously applied, is safe, the latter is attended with danger. The necessity of precaution in respect to ingesta will

be more or less modified by the intensity of the predisposing causes. In this city it has extended, by common consent, to all garden vegetables and to all ripe fruits; to pastry, puddings, cheese, and all the et ceteras which are not included in the following bill of fare. A healthy, robust man sits down to a breakfast of stale bread, butter, boiled eggs, and tea or coffee, or milk.—His dinner is constituted of some fresh animal food, light mealy potatoes, boiled rice, stale bread, eggs and a glass of water—perhaps of wine. For tea,—he contents himself with toast and tea alone. This is technically called a "cholera table," and prevails not only in private, but in many public houses. Not only, therefore, has it well been said that the Cholera is the "Apostle of Temperance," but it has taught mankind a lesson on sensual indulgences, which will not be soon forgotten.

The great objection to fruit arises from the direct irritation, produced by its constituent acid, and from its particular liability to fermentation during the epidemic. I have known whortleberries to have simultaneously developed the cholera in five temperate and healthy members of one family, (the Bogart family,) who were all gathered to the tomb ere the setting of that sun which rose upon their sufferings.

Dr. Gale, a very intelligent chemist in this city, is engaged in a series of experiments on the blood of Choleric patients. He has supplied me with the following facts which may interest you: "In eight analyses of cholera blood," he says,

"there has been a universal diminution of water, being, in some cases twenty per cent. and in one twenty below the ordinary standard, which is 9000. The salts, and especially the soluble ones, have been found from one fourth, to one half less than their usual proportions. The colouring matter has been found to have increased in some instances to eight or ten per cent. This blood, when drawn from the patient, appeared like the dregs taken from a cask of old port, of a muddy purple."

A fact worthy of remark is, that those who have long suffered from the premonitory symptoms, have lost both the water and salts of the blood in proportion to the profuseness of the evacuation; which renders it probable that the loss of water and salts from the fluids of the system would occur from any profuse evacuation.

The principles of the blood which have been lost, have been found both in the evacuations and the perspirable matter.

Very respectfully, &c.

P. S. It has been contended, that a critical reference to food produces a morbid sensitiveness on that subject, and that this fearful apprehension is likely to impair still more the healthy tone of the stomach. The argument, however, is not sustained by the facts. It is fear which impels us to an observance of food and to avoid the exciting causes. When public attention is properly di-

rected to this subject, and the exciting causes are well understood, the fears, which agitated the individual, are allayed, and he eats his food with a conviction of its inoffensiveness. This is conclusively shown by the almost universal exemption from cholera of such as are properly abstemious; and I have had the most ample demonstration that the victims to this disease, among the sober members of society, have been such as have disregarded the admonitions of experience in relation to food.—An attempt at concealment is natural enough, where the sufferer has been in some measure the victim of his own imprudence; but I think that society requires the benefit of every illustration of this subject, and I do not hesitate to declare my conviction, that in most instances the disease, in this city, has been the direct result or some error on the part of the individual.

LETTER IV.

New-York, *August* 22, 1832.

Dear Sir,

A few days ago, in replying to your letter, I did myself the honour to state to you the results of my own observation, and that of others in whom I have particular confidence, in the treatment of the "premonitory symptoms" of Cholera Asphyxia. These symptoms continue to announce the approach of the more malignant stage, with rare exceptions, and are still susceptible of easy removal. Positive injunctions must be given to the patient, to deter him from injurious indulgences during his convalescence, a propensity to which, I have had occasion to remark, is a characteristic symptom, and which frequently involves the sufferer in a most abrupt transition to the fatal stage of collapse. To effect an observance of the proper objects of attention, it is not unfrequently necessary to excite the fears of the individual.

I adverted in a former letter so very briefly to the treatment of the cholera in its advanced stages, and as the disease has not yet presented itself to your observation, I have determined to avail myself of a few moments of leisure, to submit to you

the experience of the best physicians in this city. There was, at the irruption of the epidemic, a greater diversity of practice than prevails at the present time. The fatality of the disease, and the different views which were entertained of its proximate cause, necessarily suggested many remedial agents of conflicting principles, and every subordinate expedient that ingenuity could devise. I always commended this enterprise and resource of the profession, although it was sometimes opposed to my own prepossessions. The experience of foreign practitioners was only conclusive as it related to the epidemic in their own climates. It had here invaded almost another world, and it was fair to presume, that its character would be modified by the great physical differences of climate, and a thousand local accidents. It was a just presumption, that what was true of one remedy in Asia, and of another in Europe, might be found inapplicable to the modified disease in America. There was, and is, nothing settled in regard to the proximate cause, and, therefore, we could derive but little assistance from established principles. Our only guide was existing experience, and our only hope, in the favourable direction that might be given to experiment by modifying circumstances. Each practitioner, therefore, met the destroyer with such weapons as experience had provided, or his own ingenuity suggested. Their incongruity was certainly indicative of the undetermined nature of the disease and of its great fatality Each system of practice, and almost

every remedy employed, have been fully and fairly applied; and after a careful observation of their results, I am prepared to say that we have gained nothing since the disease invaded Europe. It is the same disease here as it was in Asia,—but little modified by those great physical causes which distinguish the different climates of the earth, and which not only generate peculiar diseases, but exert the most sensible influence on the moral and physical condition of man. If less distinguished as a specific disease than those of the great contagious family, it is certainly not less remarkable in the uniformity of its phenomena; and it is almost equally characterized by pathognomonic symptoms. This identity, also, is further illustrated by the coincidence in the results of our treatment, and that which has been applied in other parts of the globe. From this rule, however, must be excepted the very important remedy of blood-letting, which was found so beneficial in the Indies; but even to this we have not given that full opportunity, on which the Anglo-Asiatic physicians insisted—having either been baffled in our attempt at its abstraction, or we have not carried its effect beyond that deliquium which results from the removal of some dozen or fourteen ounces, and beyond which, we are told, we shall reach the great centre of the circulation, and re-action commences. Although the moderate depletion by this remedy, which has been often practised by judicious hands in this city, has seldom encouraged any hope of success, I am determined to employ

it, in extenso, when favourable opportunities may occur. I will confine it to those cases in which any experiment may be justified, and where the diarrhœa has not been profuse. The arteries will supply us with any quantity,—and I know not that 25 or 30 ounces of blood, so obtained, can more endanger the patient, than an exudation of 200 or 400 ounces of serum from the mucous membrane of the intestines. The disease, however, is now happily passing from this city, and should you be so ill-fated as to suffer a visitation, I shall look to you for a decision of this most important inquiry.

I entertain no doubt, that the greater success of this remedy in the hands of the Anglo-Asiatics is to be ascribed to the absence of premonitory diarrhœa in the East, and the retention of the fluids in the system when blood-letting was so usefully practised. It is equally apparent, also, that we may depend on a greater probability of success, should we be so fortunate as to meet with the blood not already deprived of its serum.

In regard to *calomel*, my own experience is sustained by that of our best physicians. From the particular irritability of the mucous membrane, and the profuseness of the discharges, the prepossessions of many physicians, who now regard it with a sense of dependence, were adverse to its exhibition. The little encouragement, however, which they derived from other remedial agents, directed their attention to the declaration of foreign physicians, that this medicine not only allays the irritability of the mucous membrane,

but induces that change of action which is necessary to the re-establishment of health. I may safely assure you, Sir, that our best practitioners now employ calomel in doses of 10 to 30 grains, with more confidence than they repose in all other remedies. Either with or without small quantities of opium and camphor, according to the existing state of the serous evacuations, it seldom fails to allay the irritability of the mucous membrane, and of the system generally; to mitigate or remove the spasms; and if the case be susceptible of relief, to convert the discharges from the appearance of rice water to that of the green confervæ, or the not infrequent blackness and consistence of boiling tar. This transition is nearly a sure omen of a radical change through the whole system. Then are we delighted with an almost simultaneous developement of the great functions of life. The action of the heart is no longer almost extinct; we press the arteries with a thrilling sense that Death himself is subdued; we are warmed into hope and joy by the returning heat to the extremities; the hand no longer burns on the region of the epigastrium, where the heat may have borne a contrast at 106 degrees; the features begin to expand, and the prophetic blueness to fade away into the flush of life or the vermilion of a less dangerous congestion; and although a spectacle, rare in opposition to others that have baffled the same skill and the same physical means, we contemplate the result even with admiration, so great is the victory, and so obvious the triumph of art.

Although calomel thus transcends all other resources in the treatment of Asphyxiated Cholera, there are subordinate agents of indispensable importance. These consist chiefly of all those means, which, applied externally, stimulate the skin and excite the vascular action of that organ. Heat is the most important, and is commonly applied by accumulating around the patient bottles of boiling water, bags of hot sand, the air bath, &c. Hot chalk is an excellent application when the skin is wet with perspiration. Stimulants of every kind have been employed, and none more universally than mustard cataplasms to the extremities and abdomen. It is my practice to apply a very large blister over the abdominal region, as soon as there is the least probability of its making any impression. An ointment has been introduced at the Greenwich Hospital by its intelligent and ingenious physician, Dr. Roe, and adopted with evident benefit at other hospitals and in private practice. It consists of one pound of strong mercurial ointment, seven ounces of Cayenne pepper and seven ounces of camphor, intimately blended. The whole surface of the patient is thoroughly rubbed with this composition, by means of a brush, and the process frequently repeated till reaction ensues, or salivation is effected. Another ointment has been compounded by Dr. Rhinelander, of the Crosby-street Hospital, and is prepared in the following manner: Take of red pepper and camphor each half a pound, simple ointment one pound, muriatic acid one ounce. Triturate to-

gether the powdered camphor and pepper, adding the acid. Pour the mixture into the melted ointment, carefully stirring it. The ointment is very freely applied to the whole surface, and the skin afterwards covered with hot chalk. In this preparation, the active principle of the pepper is evolved by the acid, and it possesses, therefore, the advantage of being more stimulating than the other, but it wants the specific property which is imparted by the mercury. Dr. Roe's prescription is found an excellent adjuvant, in co-operation with calomel, in producing the constitutional effect of that substance, and, with proper subsequent treatment, a patient is rarely lost after salivation is established. Various other stimulants, more or less compounded, are in use, and are all found preferable to dry friction.

The *hot bath* has not been much employed, and has been considered inferior to the other means of applying heat. I once assisted some medical friends, in immersing a patient, whose case presented all the striking phenomena that are described by the oriental physicians, in a bath in which was diffused a pound of strong flour of mustard. I have seen no case since, terminating fatally in so short a time, in which reaction was more fully effected, and I have not since repeated the experiment. Time for action is short, and there has never been a tub or water at hand. From the result of that application, although the patient died soon after, I think the mustard bath is worthy of further trial. Dry heat by means of

burning alcohol has been fully applied, but with no very useful effect.

I have been long in the habit of employing *ice* for the relief of vomiting, and it is found essentially useful for the same purpose in Cholera Asphyxia. It also allays the thirst, and thus removes one great cause of restlessness. How far it exerts an impression on the morbid action is a subject of inquiry. An extraordinary degree of heat is evolved about the region of the stomach. In one case, in which I applied the thermometer to the surface, a temperature of about 106 degrees was denoted while the patient was expiring. I have imagined that these cases will be more generally benefited by the external application of ice to the epigastric region, than by mustard cataplasms. Ice, too, I have applied advantageously to the head in obvious congestions of the brain, which are frequently attendant on Cholera, or arise as one of its consecutive diseases. It is also very advantageously applied, for the relief of spasm, to the muscles affected.

Stimulants, internally, have been almost unanimously employed, and by some to a very great extent. We have seen but little benefit arising from them, and least of all from opium given as a stimulant. I think the Cholera has conclusively shown that its mode of action is *sui generis*, and not analogous to that of alcohol. In very moderate doses, it is useful in allaying the irritable state of the mucous membrane, particularly in restraining the evacuations; but, beyond this purpose, I

believe it never fails to do harm. The best of the profession, and who have seen most of the disease employ alcoholic stimulants in great moderation, and generally prefer the more volatile and diffusible. Their use is clearly suggested by the failing powers of life; by the very languid state of the circulation, and other phenomena incident to approaching dissolution. But, in opposition to these symptoms, they are contradicted by the pathology of the disease,—at least by some of its local developements. We have seen no benefit from their liberal use, and it is even doubtful whether they contribute much in any quantities. It requires the conviction of experience, however, to enable us to abstain from their use, and to resist the impulse to apply them to the dying spark.

One of the best properties of these agents is that of allaying nausea and vomiting, particularly diluted brandy. Dr. Arnoldi, of Montreal, informs me that he employed with great success small quantities of brandy and strong coffee in combination; but I have never tried it.

Emetics have not been the subject of much experiment. Experience in the old world has admonished us of their danger; pathology is opposed to their exhibition; and the alarming irritability of the mucous membrane, and the terrific prostration of the vital powers, have deterred us from their use. We have hastened to quiet the tumult by more sedative or by exciting means of another character. Where they have been employed in Asphyxiated Cholera, I think

I am warranted in saying they have hastened the fatal termination. Where they have been employed with success, I have no doubt it has been in what is regarded as the forming stage of the disease.

In the progress of convalescence, emetics are occasionally salutary, but it is only after an absolute impression has been made on the morbid action. It has been very judiciously observed by a committee deputed by the Kappa Lambda Association, in their publication on this disease, that, "after the system begins to react, and the calomel to operate, there is a discharge of immense quantities of dark porraceous bile, like boiled spinage, and this often collects about the præcordia, creating great distress, even so as to prevent the patient from lying on either side. This very troublesome symptom has been found to yield immediately to the operation of an emetic of warm salt water, or of Seidlitz powders repeated at intervals." The result of the observation of the committee is of course correct, although I think the philosophy wrong.

Cathartics. I have not placed calomel in connexion with this class of remedies, as its superior advantages in Cholera depend on its specific mode of action. Its ultimate operation as a cathartic is doubtless desirable, but not essential to the changes it exerts. When we have accomplished all that we contemplated in the preliminary treatment of Asphyxia by this remedy, and a cathartic is indicated, none answer so good a

purpose as castor oil. I have long been satisfied, though I do not recollect to have heard or to have seen the remark, that castor oil exerts a specific action on the liver, and sustains a rank, in that relation, only subordinate to the mercurial preparations. It manifestly co-operates with the latter in the production of bilious discharges, and will, independently, produce that result more than any other cathartic. It possesses, also, the eminent advantage of generally irritating less the mucous membrane, or prostrating the strength. Dr. Caldwell, of Montreal, informs me in a letter to Professor M'Naughton and myself, that he employed as a cathartic, after the exhibition of calomel in the earlier stages of this disease, tart. potassæ ʒij. in a little warm chicken broth, which he repeated every second hour until it operated freely. "Nothing," says that eminent gentleman, "seemed to allay the gastric irritation so well as the soluble tartar. In many instances it seemed to act as a charm, and I do not know a single instance of any one, who went through the influence of this treatment, that was subsequently attacked with Cholera." In the progress of the case, rhubarb and magnesia, especially when combined with more than an equal quantity of Rochelle salts, answers a good purpose. The salts, probably, by accelerating the operation, prevents the rhubarb from irritating the mucous membrane. The common saline cathartics, uncombined, irritate the bowels, and are generally prejudicial. I know but little of the ac-

tion of the resinous, not having employed them from their irritating properties. I have seen Asphyxia produced by their severe operation. Armesley often combined aloes with his scruple doses of calomel to effect more perfectly the evacuation of the pultaceous creamy matter, which often filled the intestines, and to the presence of which he ascribed so much evil. We do not find this an attendant symptom, to any great extent, of our choleric patients. I think also that an objection applies to the irritating properties of senna, and I believe it is very rarely used. Charcoal is given by a few as an adjuvant to other cathartics. This class of remedies is clearly only indicated after a considerable change in the morbid action has been effected by other agents.

Camphor has had in New York its few warm and respectable advocates; but the great proportion of the profession have not the least confidence in its remedial properties. Its cause has not been sustained by any authenticated cases, and when employed alone, it has been perfectly abortive in my own hands. It is directed to be exhibited in doses of three to five drops of the saturated tincture, frequently repeated; and to be employed, at the same time and in larger quantities, in the form of enemata. It is very useful in allaying some of the symptoms of the "precursory stage," and is an excellent adjuvant in subduing the irritability of the stomach and bowels, and controlling the spasms in the advanced stage of Asphyxia. For this latter purpose, also, it exerts

a good effect when applied externally. It imparts to opium a more sedative effect, and forms with that substance and calomel an admirable combination when vomiting and diarrhœa exist. It is liable in large doses to produce determination to the brain. When employed as a specific, its exhibition proceeds on the homopathic plan.

Opium and its preparations. I have briefly adverted to this substance as employed by some physicians with a reference to its supposed stimulating properties, and have explained the general result in the use of it. When given in excess, it seldom fails to aggravate all the phenomena of congestion, and has done more mischief in the premonitory stages. It is valuable when cautiously employed, and it not unfrequently happens that one preparation is preferable to another. In a former letter, I indicated some of the conditions of the premonitory stage in which it was evident that the camphorated tincture was best. Dr. Tappan, of the Park Hospital, informs me that he exhibits with the first dose of calomel about ten grains of Dover's powder with a happy effect; and I may here remark that it is frequently his practice, after the plan of some Anglo-Asiatics, to administer a full dose of opium immediately after bloodletting in the less advanced stages of the disease; a practice which is sustained by the report of the Kappa Lambda Association. I have found in the *sulphate of morphine*, a preparation, least of all liable to objection. Its astringency is not sufficiently great to arrest any profuse diarrhœa; but

where it is chiefly an object to allay the irritability of the stomach, to subdue the spasms, and to tranquillize the system, its effect is admirable, and its tendency to increase congestion comparatively little. When purging and vomiting exist in connexion to any great extent, it is useful to give the sulphate of morphine, and to administer the tincture of opium by injections. The *sulphate of quinine* has been employed in a few cases at the Crosby-street Hospital, with and without calomel, in doses of ten grains, once in an hour or two. The effect has been uniformly rather bad, and the patients have died. *Charcoal* has been employed by a few physicians, and is in still greater repute as a popular remedy. By the latter class, it is of course only exhibited in the mild stages of the disease; and when any apparent benefit has arisen from it, the subjects, I believe, in all instances, have only been affected with the premonitory symptoms. It certainly can exert no effect on the vital properties, and, of course, does not reach the functions through the only media by which such a disease can be subverted. Its action is evidently merely chemical, as an absorbent, and laxative by its mechanical irritation.

Injections are very subordinate remedies, and have been most advantageous when employed to impart heat to the intestines through the medium of water, or restrain evacuations by the agency of opium. Large quantities of hot water have been sometimes absorbed in an hour or two, after being injected. At other times it has been

removed, at a very reduced temperature, without any sensible diminution of its quantity. This is probably a better mode of administering alcoholic stimulants, than by the mouth. The weight of experience here is more in favour of this method. When vomiting does not exist in connexion with diarrhœa, it is also better to restrain the latter by injections of laudanum, than to introduce much opium into the stomach. Composed of warm water, they are useful auxiliaries in the progress of convalescence, to relieve the tormina which sometimes proceeds from the irritation of the acrid bile. An infusion of *tobacco*, according to the suggestions of Mr. Baird, was kindly injected at my request, in one or two cases at the Crosby-street Hospital, but evidently with a bad effect. Other gentlemen have informed me that they have derived no benefit from its use. A solution of the *super sulphate of alumen* was freely administered per anum et per orem, at the Bellevue Hospital, where it was used on the principle of its astringency; but I believe the very enterprising gentlemen of that institution were disappointed in its effect.

Cupping and *leeching* have had a full proportion of our attention. They are less salutary than general blood-letting, when it is an object to produce an impression on the whole system, or for the relief of high vascular action, whether local or general. In Asphyxiated Cholera, where there exists more than the usual determination of blood to the head, they have been found useful, and contribute to the relief of oppression at

the precordia, and some of the varieties of abdominal distress. Like general blood-letting, the local abstraction is often indispensable, in the treatment of some of the consecutive diseases.

Transfusion, according to Dr. Latta's method, has been tried, and found wanting. It has been employed in numerous instances at the hospitals, and in private practice. I have injected but one patient, who was surprisingly benefited for a short period, but who soon relapsed into his dying condition, and expired in three hours after the operation. The results of this experiment have been generally uniform. The circulation is re-established, and sometimes with considerable vigour; the temperature of the body is universally augmented; the cold perspiration is converted to an animating warmth; the oppressed respiration is removed or relieved; the livid hue of the features is changed to the flush of health; the general restlessness is subdued; and the patient exclaims that his cure is almost completed. I witnessed an interesting exemplification of these phenomena, in a very robust subject, at the Crosby-street Hospital, who was suffering the whole array of symptoms that distinguish the collapsed Cholera. The operation was performed by Dr. Depeyre, and the solution injected stood at the temperature of 114 degrees. A thermometer was introduced within his mouth, and the temperature marked at 93 degrees. Three pounds were slowly transfused, and the thermometer had risen to 101½ degrees. All the evident improvement I have noticed above imme-

diately ensued, and the man laughed aloud from the ecstacy of relief. This man was a corpse an hour after. These results embarrass the hypothesis of the humoral pathologists, and supply another argument to those who assign the proximate cause to a modification of the properties and functions of organic life, and who regard the alteration of the blood and the other fluids as consecutive, and only one of the numerous symptoms which arise from morbid action.

I can only learn that "Dr. Leo's Method" has been tried at the Greenwich Hospital, notwithstanding its claim of novelty, and the well-known properties of his remedy. It was found wholly inert.

Electricity has received but an unsatisfactory trial, though I am informed that it has produced no sensible effect.

The hypothetical treatment of Dr. Binaghi has been put to the test, especially at the Crosby-street Hospital, and has added another demonstration of the inefficiency of remedies that are directed to the primary impression of a morbific poison, acting, by concession, through the *medium of the nervous system*, but having involved every other tissue, and deranged the whole economy of organic life. The moxa, burning alcohol, et id omne genus, having had their day, no longer torture our patients in vain. The sulphate of quinine, I have said, has been also insufficient in the few instances in which it has been given; but as to strychnine, brucine, &c. commended by this writer and Haaz, I cannot

learn that they have received any notice; nor do I know that hyosciamus and cicuta have been applied as remedial agents.

The *oxygene* and *nitrous oxide gases* have been tried at the Greenwich and other hospitals; but I am informed by the gentlemen connected with three of those institutions, that they have obtained no benefit from their use,—and that the blueness of the skin was not even influenced.

A negative part of the treatment, of very great importance, consists in the exclusion of all food, and even of water,—so necessary is it to subdue the irritability of the stomach, and so easily is that organ offended.

I had intended, when I began this letter, to have illustrated our practice by its application to particular modifications of the disease. There are very few who have any confidence in the specific action of any remedy; and that treatment can only be successful which is determined by general principles, and the peculiarities of each individual case. The best indications are frequently derived from idiosyncrasies, and where these are neglected the greatest advantages are lost. I have no doubt that it is owing much to this circumstance, that blood-letting has so constantly failed at our hospitals, where the subjects are broken down by intemperance, or by previous disease. Too much praise, however, cannot be given to those gentlemen who have employed a remedy so philosophical, and yet so opposed to prejudice, when it was obvious that empyrical practice, or even the power

of calomel, must fail. Since my preceding observations on the subject of blood-letting, I have been informed by Dr. Dekay, that, in his private practice he has adopted this remedy, with the best success in very advanced stages of the disease, when the constitution of the subject was adequate to a co-operation with art. This gentleman exhibits diffusible stimulants freely at the same time, with large doses of opium, which he regards as essential to the success of blood-letting. He has not observed any deleterious effect from the opium, and its tendency to produce congestion is counteracted by the impression from the abstraction of blood.

Very respectfully, &c.

LETTER V.

NEW-YORK, *August 25th*, 1832.

DEAR SIR,

HAVING hitherto restricted my letters to practical remarks on the Cholera of New-York, I shall venture to digress from experience to theory; although I do not imagine that you can be much interested by any communication, which does not relate to the important facts that appertain to this subject. Still, the propensity to speculate on these facts becomes irresistible; and however one may, at first, resolve not to entangle himself in the mazes of hypothesis, he unavoidably arrives at principles which influence his judgment, and which finally become so important to himself, that he cannot believe that they will not be interesting to others.

The first opinion I intend to examine is that which places the proximate cause of the Spasmodic Cholera in the bowels, and which supposes *inflammation* of those organs to be the source of the whole mischief. This doctrine is insidious, and derives great plausibility from the frequency of the small intestines exhibiting a pinkish appearance,—from the occasional soften-

ing of their tunics,—from the vomiting and purging,—and from its being capable of explaining many of the morbid changes that arise in other parts of the system, on the principle of sympathy. But inflammation, to produce such extensive sympathies, and such a rapid succession of phenomena, so soon resulting in death, must be severe. Its existence, however, is scarcely denoted by many of its usual characteristics. There is never any hardness of the pulse, no cupping of the blood, and scarcely a pelicle of coagulable lymph,—abstracted with whatever care,—no tenderness of the abdomen and no continued pain, no remarkable prostration of the muscular strength, no dryness and no redness of the tongue or fauces, and no symptomatic fever. Pathological anatomy is scarcely less conclusive against this theory. Our own necroscopic researches correspond with the observations that have been made in the other hemisphere. We look in vain for that florid redness which distinguishes acute inflammation. Its hue is dull, nor does it exist in those minute vessels which are the instruments of that mode of disease. It is evident, that this appearance exists in the venous and not in the arterial system. The larger arteries, leading to the intestines, are exhausted of blood; the veins are commonly full, and there is never presented any of that minute injection, which would be necessary to the existing condition of the larger vessels, did the redness reside in the terminating series of the arterial vessels. But this redness

does not uniformly belong to the mucous, and may then be found to exist in the serous tissue ; as was observed in the case of the black female which I reported on the 2d of July, and which is noticed by others. The constitution of these tissues is so different, and the ordinary results of their morbid affections are so characteristic of their peculiarities, that striking modifications should at least arise, when inflammation of one or the other might happen to be the proximate cause of Asphyxiated Cholera. The almost constant pathognomonic symptoms of this disease, the very uniform combination of more accidental phenomena, and the analogies supplied by other tissues of the system, are certainly opposed to an hypothesis which ascribes the seat of the inflammation, indiscriminately, to the mucous or the serous organs. And here let me remark an important circumstance, which adds to the obscurity of the subject. Notwithstanding the redness be wholly confined to the serous tissue, the discharges of serum from the mucous membrane are as abundant, as when that organ is the seat of the vascular fulness. These are phenomena which require investigation. This irregular developement of congestion, and sometimes of inflammation, in one or the other of these coats of the intestines, will doubtless account for the tenderness of the abdomen in some instances, and for its absence in most. It has, however, happened in many instances, that the appearance of redness is wholly wanting, and we are then told that the nature of

inflammation is not understood, and that redness is not necessary to its existence. Thus driven from the most difficult entrenchment, the hyperæmia of Andral is preferred by some, for the still greater ambiguity of the term, and its more generic import. But, yet another sign. The mucous tissue is softened,—it is disorganized,—and therefore is denoted the most active inflammation. When was it proved, I would inquire, that no other mode of action is capable of producing such a change? Who ever, before, witnessed the Cholera Asphyxia? and may there not be something in that disease, differing even from inflammation, that may modify or derange the structure of organs? What action is that which precedes mortification of the lower extremities in subjects of an advanced age, without any apparent exciting cause, or any sensible evidence of inflammation? The morbid action of Cholera sometimes tends to the disorganization of the whole body. We see it in the blood before life is extinct,—we recognisé the withering poison in the frequent flabbiness of the heart,—and we are sure, from the rapid decomposition of the body, in some cases, that there had been almost a conflict between the vital properties and the laws of chemistry.—I will not illustrate these phenomena by the operation of the electric fluid,—for I believe that they arise not alone from the absolute extinction of life, but owe much of their production to the elements of disease. This argument, however, like the last,

is deficient in the uniformity of facts. The softening of the mucous tissue occurs without any other sensible mark of inflammation, or does not exist where inflammation may be obvious; and in a majority of cases it does not occur. It is sometimes seen, and again is absent under the most similar circumstances. The most remarkable instance I have witnessed occurred in the black female to whose case I have alluded, and whose disease was of short duration. I accidentally omitted the fact in my report of that case, but every tissue of the small intestines was so softened, that they were easily penetrated by my finger. It will be recollected that the appearance of congestion, in that case, was confined to the serous membrane. It is said that the glands of Brunner and Peyer are enlarged, and that thus this particular species of morbid action is denoted; but this argument, like the others, must fall from want of the fact. I have known it to have been absent in at least an equal number of the many cases which I have seen examined, and the weight of the best authority is against it. I have seen these enlargements in some instances, the evident consequence of an antecedent chronic diarrhœa.

Perhaps the fallacy of this doctrine, which I have endeavoured to invalidate, may be illustrated by the recital of a single case, though others analogous are constantly occurring. But a few days since I was summoned in the morning to attend a young lady who had been attacked in

the night with malignant Cholera. She had been for a few years rather delicate, and susceptible of congestive diseases of the abdominal viscera. Since the irruption of the epidemic, she had been twice affected by diarrhœa, but which spontaneously subsided. The last attack was four or five days anterior to the catastrophe of which I am speaking; and during the intervening period all was quiescent. I entered her chamber at fifteen minutes before seven o'clock, and her hyppocratic countenance expressed but too truly, that the destroyer had almost done his work. Her case, therefore, may be briefly told. She had felt entirely well on the preceding day, and up to the hour of retiring at twelve o'clock. She had eaten for her dinner of hashed-beef, a few stringed beans, a light mealy potato and a small beet. The repast was finished with baked rice pudding and a sweet sauce. I believe, however, they were all taken in moderation. At her tea she took nothing more than toast. Between eleven and twelve, prompted by a good appetite, she ate again of the cold pudding and sauce, and retired to obtain the sleep from which she was destined to awake in death. At four o'clock the invasion took place, and from the progress of dissolution, when I saw her, she must have begun to die at that hour. At half past 10 o'clock, life was perfectly extinct. Here is a violent, and a rapid case, and did the symptoms denote that aggravated inflammation of the bowels, which should have existed, had such been the

source of the phenomena? Nothing can be inferred from the pulse, for that was almost insensible.—The tongue was as natural as in health.—The more important evidence of tenderness of the abdomen was totally wanting,—and the profuse discharges of serum were neither preceded, nor attended with pain. The patient protested against a cataplasm to the abdomen, "as she had been much more severely affected before, and had recovered without any remedy."

I am far from believing that the pathologiac state of the stomach and intestines has not a very important connexion with the disease, and exerts a most positive influence on the whole system; augmenting the violence of the constitutional symptoms, and precipitating death. The common developement of the earliest symptoms of disease occurring in those organs,—the profuse and morbid secretions which soon ensue,—and the very general redness of the mucous or serous tissue,—render it evident, that there is a particular determination of the morbid action to those organs;—and their well known properties, and important relations, can leave as little doubt, that the whole circle of sympathies is variously and extensively disturbed. The astonishing discharge of serum from the mucous membrane cannot be the result of a mechanical process. The vital properties, and the modified functions of the extreme vessels, must be concerned in the production of this fluid; but the secretion is so rapidly performed, that the component parts of

the blood are separated, without supplying that usual evidence of change, which marks the productions of analogous processes. With as much propriety may it be said, that the profuse discharge from the skin is a simple exudation from the blood, as the separation of the serum by the mucous membrane may be attributed to the same mechanical principle. Whether the mode of action be always the same, or what particular modifications may arise, it will probably be difficult to determine. Dissections must be made with an especial reference to this inquiry, which may yet reflect other light on the pathology of inflammation. It may yet appear that the fluidity of the blood is so affected, that its red globules can no longer enter the extreme vessels; or perhaps, that the depletion of the instruments of disease has so modified their vital properties, that irritability is rendered more obtuse, and the red globules recede to the capillary system. Certain it is, that the blanched appearance of the large intestines is generally greatest as the disease has been protracted, and the discharges profuse. I know not whether it be true, that there exist more of the common evidences of inflammation in subjects that have not been affected with vomiting and purging, as such instances are rare, and I have not witnessed, nor can I learn that dissections have been made where death has occurred under these circumstances. I very recently attended the examination of a robust subject at the Crosby-street Hospital, who died in a few hours

after transfusion with the common saline solution. His habits were intemperate, and the disease was severe and rapid. The examination was made about eight hours after death. In this case, the loss of serum had been partially supplied, and of course, the blood was more than usually dilute. The small intestines appeared to several observers, who had witnessed numerous dissections at this and other hospitals, to exhibit a more vivid redness than was recollected in any other instance. The mucous tissue was very minutely injected, and presented, through its whole tract, a uniform blush of redness. It was studded with enlarged follicles, but its texture was firm as in health. There was nothing more observed that can illustrate my subject; but it may be stated, that the large intestines were rather blanched, and its mucous follicles were not visible; that the stomach was large and free from every vestige of disease; that the liver and other viscera of the abdomen were natural;—the gall bladder full of greenish yellow bile, none of which had escaped into the intestines;—the bladder perfectly contracted;—the lungs partially inflated and entirely natural, and the heart soft and flabby;—its cavities and the larger vessels were well filled with blood, nearly as dark, but rather more fluid, than in those who die without the saline transfusion.

It is not improbable, also, that a contraction of the extreme vessels, may occur extensively through the system, by which the red globules would be further excluded.

Although I do not advance these conjectures as probable, and believe that the absence of the usual phenomena of acute inflammation is strongly indicative of some other mode of action, I could still desire, that further investigation may enable us to resolve this morbid state of the intestinal canal into a modified form of inflammation. The treatment, not only as respects these organs, but also the influence of their diseased action on the whole system, would then be more within the reach of philosophy, and those principles which experience has established. But whether inflammation, or some mode of action essentially different, I cannot doubt that it is only a part of an original series of morbid actions as extensive as the numerous functions of the system.

There is one analogical fact, in the view of the subject just taken, that may encourage the presumption that the action is allied to the proximate cause of inflammation. It is now generally conceded that profuse hæmorrhage from the mucous coat, whether of the stomach or intestines, is frequently the direct result of acute inflammation, and proceeding from the secretory organs of that membrane. It appears, therefore, to be a fair suggestion, whether the fluid evacuated, in a great proportion of choleric subjects, may not be the product of an action analogous to inflammation. We have all the constituent parts of the blood with the exception of its red globules; and it may be farther remarked, that as in patients affected with

Cholera, the discharge is generally sudden and profuse,—so also in hæmorrhagic inflammation is the evacuation of blood surprisingly abundant ;—and under either circumstance, the system sustains the depletion, with less prostration of its powers, than would arise from any other mode of abstracting the vital fluid. Perhaps not the least remarkable incident attending this secretion of the component parts of the blood, is the great uniformity of its occurrence wherever the Cholera has prevailed. But opposed to these conjectures, which may be advanced by the advocates of inflammation, is nearly the whole symptomatology of the disease ; and let it not be imagined, that in having thus given a fair representation to the subject, I am already becoming a convert to the doctrine which regards inflammation of the bowels as the proximate cause of Cholera. I am not only willing, but could even desire, for the reasons which I have assigned, that it may be yet determined that this mode of action is analogous to something with which we are familiar, and the treatment of which may be embraced under the settled principles of our science. We shall have accomplished much, if we can relieve the intestines of the weight of disease which they so generally sustain, and in doing which the constitutional derangement will be released from an overwhelming sympathy,—and the blood vessels will be no longer exhausted.

Have the *Humoral Pathologists* supplied us with a better solution of the great problem of this disease ? I cannot believe that their philosophy

will bear the analysis which must ultimately sustain the conclusion at which reason aspires. The most critical examinations do not detect any foreign substance in the blood, nor have its elementary or component principles formed any new combinations. If the due proportion of its constituent parts have been disturbed, and we find a diminution of the serum and the salts, by carrying the same investigation a little further, we shall discover them in the form of secretions, and by that very circumstance, denoting the essential agency of the solids in their separation. But before this diminution takes place, and while yet there are ample phenomena to evince the malignancy of morbid action, we find the blood still constituted as in health, and only yielding up its physical characters to the organized parts of the system. It is only as disease advances, that this vital fluid succumbs to the influence of the modified powers and functions; and at last when dissolution begins, the changes have become quite apparent. If diarrhœa or vomiting have attended the case, we discover an absence of the serum or the salts in the ratio of those discharges. Hence we are told, that the problem is demonstrated, and that we have nothing to do but to *replace the evacuations*. It is then that the lungs refuse to perform their office, and respiration is almost at a stand. What is the unavoidable result of the interruption of this function, no less remarkable than the impaired action of another organ, on which so much emphasis is laid? It

is an imperfect oxygenation of the blood—and therefore "*oxygen gas* is a specific for the disease." This failure of decarbonization can never be detected till evident lesions have occurred in some of the great organs of life. Does the blood sometimes refuse to separate into its component parts? This is only so in the advanced stages of the disease, when other sensible changes have been the slow result of the morbid process, and may be regarded as a rare phenomenon if the blood be properly abstracted.

Perhaps the most remarkable appearance attending this fluid, and which I announced in two cases lately reported to you, as the discovery of Dr. Gale of this city, is the extrication of the oil of the blood, and its existence in a free state in every part of the vascular system. If any other accidental deviations in the sensible properties of the blood have been sometimes observed, as its diminished fluidity where vomiting and purging had not existed, it has only been when the organic powers have suffered in more than a corresponding ratio; and the complexity of that fluid, and its probable vitality, will afford modes of accounting for such deviations, and render the principle of explanation which I have adopted sufficiently comprehensive. Do we find in the fluids secreted any evidence of a morbid condition of the blood? Let us examine the results, as the extinction of life approaches.—We detect nothing more in the evacuations from the alimentary canal than the component parts

of the blood itself. The organs of secretion have scarcely produced any change in their properties, or their relations to each other, and it is the fairest inference that there is nothing here to countenance the opinion of vitiated fluids. If Christie, Annesley and others, discovered in the intestines an opaque, pultaceous fluid, its existence did not occur to other observers, and I believe has been rarely noticed in this hemisphere. The acid of Hermaan is now forgotten, and with it his treatment is involved in the same oblivion.

The analyses of the bile, which have been made in Europe, have detected nothing unusual in that fluid, and we discover no other remarkable changes in the other secretions of perspiration, urine, and saliva, than their increase or diminution, or some variations in the proportion of their constituent parts.

However this inquiry may be pursued, we shall find nothing to sustain the humoral pathologist. Even his very remedies discourage his philosophy. Does he endeavour to restore to the blood its fluidity by the transfusion of water, or recombine its constituent salts? He is, at most, elated only by the beam of hope, which for a moment animates the brow of his patient; but who soon relapses into the apathy of death, and brings a chill over the enthusiast.—That these experiments may continue to be repeated will be less remarkable, than the blind zeal of Hermaan, who successfully promulgated an hypothesis in Russia, which Ainslie had imagined and Annesley refuted in India.

The acid was fully demonstrated not to exist in the secretions, and it was no less shown that it could be only detected in its natural combinations in the blood. Has the saline treatment of William Stevens been attended with better success? There is good reason to believe, that even in tropical fever, which he esteems a kindred of Cholera, the principal agents were blood-letting to an extent of 30 or 60 ounces, calomel, emetics, sulphate of quinine and Croton oil.* It is useless to multiply objections. I know of no remedy, suggested by this hypothesis, that experience has sanctioned, or that has not left the projector its solitary advocate.

In conclusion of this subject, it is difficult to understand how the morbific poison can produce a direct influence on the blood, even if the vitality of that fluid be fully conceded. It is sufficiently difficult of apprehension, that the agency of the virus is originally through some part of the system, more material and more eminently endowed with the properties of life. That its primary action is exerted on the great source of sympathy and sensibility is even hypothetical, and although from the susceptibility of this system of organs to external impressions this is the most intelligible solution, it is still so impossible

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* Vide Medico-Chirurgical Review, vol. xx. 289.—My friend Dr. Holmes, of Montreal, informs me that he has tried Dr. Stevens' method in a few instances unsuccessfully. I have not known any useful results from it in New York.

to comprehend the mode of action, that the mind involuntarily glances to other organs, or even to the unorganized blood, and seems to find repose in the greater darkness by which the subject becomes enveloped. If the poison be introduced and combined with the blood, as maintained by Searle, Stevens, Desruelle and others, the fact must be shown, before the doctrine can be tenable. Is the supposition that the poison produces its first impression on the solids more encumbered with difficulty, than that which introduces it into the blood through the medium of an organized part, and then supposes that in the course of its distribution, and thus diluted, it produces the physical changes through the system; or, than that which maintains that a direct and primary impression is made on the blood itself, by which the subject is not only embarrassed with the inexplicable mode in which that change is produced, but there is superadded an equal difficulty in explaining the possible manner in which the blood, thus diseased, so suddenly and so fatally deranges every function of life? The existence of the poison is absolutely hypothetical, and is only inferred from the necessity of supposing some universal cause, and from a long series of analogies; not from our ability to detect its presence in any mode of its existence. I need not therefore say, that the difficulty increases as we attempt to introduce an imaginary substance into the circulation, and that the design becomes utterly visionary, when we afterwards direct its influence to

the organized system. Even the oxygen gas of the air, as stated by Stevens, is not "attracted into the circulation,"—nor even its azotic principle,—an assumption which was important to illustrate his doctrine.* If this negative fact prove any thing, it is opposed to the opinion of that gentleman.

It will be an interesting inquiry to ascertain whether the polypyform lymph observed by M. Marcus and his associates, and which is frequently noticed in this city, be sometimes produced before death, and how far it becomes a mechanical cause. I have witnessed it in subjects as early as five or six hours after dissolution, when the lymph was abundant and had acquired almost an organized appearance; and others assert that they have found it within the short space of half an hour.

Many enlightened pathologists ascribe the seat of Cholera to the *nervous system*, either without limitation, or restricting it to the nerves of the bas-ventre. Hence we have the doctrine of diminished nervous energy, and of central *ganglionite*, and *ganglionite néurilématic périphérique*. But are there any uniform indications that ei-

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* "I will afterwards," says Dr. Stevens, "bring forward some very strong facts to prove, that the aerial poisons which act as the remote cause of the essential fevers, do not produce their effect by any direct impression on the nervous system; on the contrary, they appear, like the oxygen of the air, to be attracted into the circulation, and produce their effects on the solids of the system, entirely through the medium of the blood."

ther system of nerves has sustained that impression, which is subsequently developed in the other great organs of life; or any lesions of that system, through the whole progress of the disease, that bear any correspondence with the morbid phenomena of other organs; or are there any symptoms which denote even a primary invasion of the nerves? We have so little to direct us in this investigation, that the question will probably always remain undetermined, whether it be through the medium of this or some other tissue, that the poison deranges the general functions. But that the brain and nerves are not the primary seat of Cholera,—that they subsequently participate less than some other organs in the morbid action, and at most, do but serve to transmit the impression they may receive from the morbific agent to other parts of the system, I think may be nearly demonstrated. If we look at the mind, we shall find it "sitting unimpaired and serene amidst the ruins of organic life." Respiration is only performed by the voluntary muscles,—pulsation has long ceased in the extremities,—the heart has become inaudible to the stethescope,—yet the integrity of the mind remains undisturbed; and the indifference with which it contemplates the wreck over which it presides, proves that at least its peculiar and last abode in the body is still its own uninvaded possession.

The powers of the mind are fully exercised in respect to the voluntary muscles; and it is not unusual to witness successful attempts at walk-

ing when the pulsations of the heart are only sensible to the ear. These phenomena are certainly not coincident with the attendant symptoms of other organs. The functions of the brain are wholly undisturbed, while the heart and the lungs, and all the viscera of organic life, are involved in a chaos of disordered action.

Animal sensibility is not known to be particularly affected, till near the termination of life. It is scarcely augmented or diminished, or in any way modified,—a remarkable circumstance, if we regard the common influence of disease on that property, and which serves to demonstrate the little participation of the nervous system in the great conflict of nature. The sufferer is even conscious of the unequal distribution of heat, and feels as intensely as in health, the action of stimulants upon the cold, and shrivelled and livid surface of his body. He hears and sees with a natural acuteness. The functions of sensation, therefore, remain unimpaired, and the great office of the cerebral system goes on to the last moment.

But these are facts with which all observers are familiar, and render the hypothesis of diminished nervous energy entirely paradoxical. The vital properties, with which the different parts of the system are endowed, are certainly not derived from the cerebral nerves; and the sympathetic system, as is imported by its very name, is chiefly destined to maintain a connexion between the complex parts of the most organized

bodies. The various properties, by which the functions of organs are performed, exist in them independently. The analogies derived from vegetables, and the inferior animals, in proof of this fact, are too familiar to be repeated, and illustrate the peculiar office of the sympathetic system. Irritability, mobility, &c. are implanted in the organs which they are designed to govern, and where we find them peculiarly modified and adapted to the purposes of each individual part; and perhaps it is not improbable that the brain itself, in respect to its organic life, is sustained by properties quite independent of the nervous power. If the principles of life were imparted by the nerves, and there were really a diminution of nervous power, how does it happen that irritability, contractility, &c. are so exalted in some organs, that there are frequently mnifested evidences of congestion or inflammation, which have been assumed as the ground of a doctrine? I cannot but regard it, therefore, as an axiom in physiology, that vitality, which is made up of the several properties of life, is the specific endowment of every organ. The vague designation of nervous energy is wholly another subject, and has no necessary connexion with those powers which are so overwhelmed in Asphyxiated Cholera. That the nerves, in their office of maintaining internal, and perhaps also their external, relations, and transmitting sympathies, may convey in some mysterious manner morbific impressions to the properties of other organs, is more than pro-

bable; but it cannot be said, that vitality is affected till the poison has reached the seat of that principle. In what manner, then, does the morbific agent make its impression on the nerves, and is it through the specific irritability of that system, that that impression is transmitted to the powers or properties of other organs?

In respect to the ganglionic system, if we could attribute to it any other function, than that of establishing a circle of sympathies between the organs which it supplies, the hypothesis which assigns to it the proximate cause of Cholera must utterly fail from the want of pathological evidence. But from the fact that this intercommunication is maintained by the systems of nerves, and the simultaneousness with which the Cholera is often developed in the several viscera of organic life, I cannot doubt, that they are not only interested in the process as organs of sympathy, but have sustained an original part in the incubation of the disease.

All the doctrines, subordinate to this general principle of the failure of nervous power, must necessarily fall, if the original hypothesis cannot be maintained. We shall no longer understand how the "heart is paralyzed" if we look not beyond the nerves with which it is so slightly supplied. Irritability and muscular power are predominant properties of the organ, and its sensibility is almost latent. We do not find that the latter is in any way modified; but the former powers which belong to the constitution of the heart are most surprisingly disturbed. It is with

this organ, as with the rest of the system; its properties and functions have become involved in the operation of the common predisposing cause; and perhaps it is less remarkable, that it should evince more of the morbid impression, from the eminent manner with which it is endowed with irritability, and from the general malignancy of the disease.

But my letter is running to an extraordinary length, and I have already presumed too much on your time,—and I fear, too, on the interest of my own speculations. I shall therefore proceed, in a few words, to express the opinion which I have been led to form of the nature and philosophy of this disease.

I believe that the proximate cause of Cholera Asphyxia consists in a *simultaneous modification of all the organic powers and functions*, produced by some unknown morbific poison, acting either directly on the properties, or transmitted indirectly through the nervous system. I am disposed to think, that the primary impression is on the organs of sensation and sympathy, and perhaps through the organic properties of that system. This change so produced is not merely a *depression* of the vital powers, but there is probably an *alteration* of their specific character, as seems to be denoted by the remarkable derangement of some of the functions. The constitutional disease has been sometimes so suddenly developed and so rapid in progress, that the powers of life have appeared to be at once extinguished.

That this modification is general and simultaneous will appear from the phenomena which distinguish the invasion. We must look at them, however, in the most simple and uncombined form of the disease; not as they occur in those complex cases that may be variously introduced by "premonitory symptoms." Those are instances in which either the epidemic poison, or accidental causes more or less frequently applied, produce some local derangement, generally of the organs of digestion, which subsequently becomes an exciting cause of the constitutional disease. Those are instances in which I hold, that there exists only local disease, which ultimately developes the specific action of Cholera. The exciting causes of those premonitory symptoms may also co-operate with the local disturbance, in producing the general affection; and indeed it frequently happens, that the predisposition to Cholera is so slightly formed, that the local disease subsides spontaneously, if its exciting causes be withheld, and that the general developement is only produced by an aggravated state of an almost artificial disease. That the miasm itself may produce derangement of particular organs is not opposed to the doctrine I advocate, as we have parallel instances in other epidemics.

These complicated cases of Cholera do not offer to the pathologist the unembarrassed data, which may be found in the less complex forms of the disease. If we assume a local proximate cause of the disease, we should always be able to detect its

existence; but we have now been presented in New-York with many cases in which the invasion of the most malignant constitutional symptoms was abrupt, and in which there could not be detected a solitary evidence of antecedent local disease. I have known the attack to have taken place in the most robust subjects while sitting at their breakfast, in the apparent enjoyment of entire health; and I have seen them die within five or six hours after. The invasion has arisen from the strength of the predisposition, and these cases I believe to be always fatal.

Spasms are well known to occur extensively in some places during the prevalence of Cholera, without any other symptom denoting the epidemic influence; and at other times a suppression of urine has happened to many in certain endemics of this disease, without any other derangement of the health. As well might such a subject be considered a choleric, as he who suffers the "premonitory diarrhœa," and those local derangements might as well constitute the "first stage" of Asphyxiated Cholera. The transition from premonitory diarrhœa to the constitutional symptoms is certainly sudden in this city, however it may have been by slow degrees in other countries. The patient can often define the very moment of the constitutional invasion, and the precision with which it is done seems alone to distinguish the diseases.

There is nothing in this simple form of the disease that denotes an original locality; and if in its

progress, or even at its invasion, we find one organ sustaining more of the burthen than another, and vice versa, it is only what is constantly witnessed in other constitutional affections, and does but arise from their varying susceptibilities, or the idiosyncrasies or other accidents appertaining to the subject.

It follows from the principles which I have endeavoured to advocate, that the extreme vessels must be the instruments of this disease, and it is upon those organs that we must make an impression in the treatment. One of the morbid conditions is a general contraction over the whole body. This will explain some of the vital, and some of the more mechanical phenomena. It will account in part at least for the carbonization of the blood, which can no longer pursue its unembarrassed course through the lungs; it will account in part also, for the shrinking of the skin, and the collapse of the features. Such a universal contraction must affect the general circulation and contribute to the venous congestion, and probably produces a strong impression on the heart through the medium of sympathy. But doubtless more is owing to the nature of the morbid action itself. It is established in every organ; in the liver and kidneys it is especially denoted by the failure of their secretions. It is a useless multiplication of causes to ascribe the deficiency of bile to the failure of digestive excitement;—and its disappearance from the evacuations has been unnecessarily assigned to a contraction of the ducts from

irritation of the intestinal mucous membrane. We constantly find nearly the same quantities of bile in the vesicle after death from other diseases, and it is not usual in Cholera for that organ to be distended ;—nor have I ever been able to detect more than a trace of bile in the liver, and often none. If we generally find no urine remaining, it is because the bladder is a voluntary organ, and participates also in the muscular spasm. The kidneys being more isolated, have been permitted to take their full share in the constitutional affection. So also has the heart, and the remarkable flabbiness of this organ, which I have frequently witnessed, denotes something more than sympathetic derangement ; though I cannot doubt that its embarrassed action is owing also to the influence of sympathy from different sources.

Perhaps there is no symptom that more strongly evinces the constitutional derangement than the failure in the production of heat. This is one of the earliest, and most general phenomena, and exists in every part, excepting the epigastric region, where it sometimes accumulates in a morbid and remarkable degree. The coldness of the breath and extremities, the generation of heat in the vicinity of the liver and stomach, and its distribution from this part over the system, after the laws of vitality cease to operate, are proofs of its production, by a vital process, and that its organs of secretion are universally involved in disease.

In reverting once more to that plausible theory

which refers the proximate cause of Cholera Asphyxia to the intestinal canal, and which is necessary to its identity with cholera morbus, I cannot but conclude, for the reasons I have stated, that there is little evidence that the local derangement is the primary result of the action of the morbific poison as constituting the general disease, whether we advert to the symptoms, or repose the decision on morbid appearances. In the succession of phenomena which mark the invasion or the progress of Cholera, we sometimes notice other symptoms long anterior to any evidence of the extension of the disease to the bowels, or we find simultaneous disturbances in other organs not less remarkable. Dissections are no more conclusive as to the proximate cause, and it would be idle to repeat the results which establish the want of that uniformity which can only sustain an important principle; results, which might with nearly equal propriety, refer, indiscriminately to any of the great organs of life, the seat of the disease. This variety of local developements alone carries us to the true philosophy of the disease; and when it shall be established that the whole system is simultaneously impressed by the morbific poison, then shall we understand why one organ, more susceptible in one individual than in another, or more subject to the influence of those sympathies by which it is connected with the whole system, and vice versa, is found sustaining more or less than a proportion of the morbid action, and in its necroscopic character supplying corresponding evi-

dence of disease. Then may we comprehend the greater coincidence in the vital phenomena, than in the morbid appearances; and can better understand the rapid destruction of the powers of life where the whole system participates in the invasion, than by referring these astonishing events to the influence of disease as established in a single organ.

If what has been denominated "premonitory diarrhœa" be regarded only as the result of some local affection, and ultimately becoming an exciting cause of the constitutional derangement,—then will be explained the mystery which has enveloped the issue of the treatment, when applied under circumstances of local or general disease;—then may we comprehend how abstinence alone, when diarrhœa portends the danger, will enable nature to effect her escape,—or how it happens when neglected for a day or an hour, it becomes the exciting cause of a perilous disease, which had been but the preceding moment in a state of incubation, and which now baffles the efforts both of nature, and of art;—or if submissive in cases of rare felicity, its successive and capricious developements still require the vigilance of zeal, and the decision of a firm observer, to conduct it to a slow and successful issue.

My construction of the antecedent diarrhœa is rendered still more probable from its general absence in Asia, a circumstance particularly noticed by some of the oriental writers. If it be true that

it has occurred more remarkably in Europe and America, as a premonitory symptom, it only furnishes an evidence that there exists some modification of the predisposing cause, by which a local disease is produced before the system becomes sufficiently imbued with the poison for a spontaneous developement of Cholera. The disturbances which arise in the alimentary canal, as attendant on the constitutional disease, have been every where observed, with isolated exceptions, and they have been among the primary symptoms of Asphyxia. We hence infer that the choleric atmosphere produces a particular determination of disease to those organs; and from the impaired digestion which is sustained by most, during the prevalence of the epidemic, it is not difficult to comprehend a circumstance which is strictly analogous to the phenomena of other epidemics,—that the malaria may produce in one a depression or change in the gastric powers,—and in another some functional derangement of the bowels, without exerting its malign impression on the whole system; or, if its influence be so extensive, the local affection becomes rather an exciting cause of the more general and independent disease, than existing as an integral part, until the general developement.

I regard the Cholera Asphyxia as a *nova pestis* in Europe and America, and only known in Asia within the last half century. I cannot recognise its parallel in ancient or modern authors. I consi-

der it a *fever*, of which the *collapse* is the first stage, and *reaction* the second. The *local determinations* which arise in the second stage are not necessary to the disease, but are accidental.

Very respectfully, &c.

LETTER VI.

NEW-YORK, *September 10th*, 1832.

DEAR SIR,

HAVING submitted to your consideration my reasons for believing the Cholera Asphyxia to be a constitutional disease, I would present you in this letter with a brief analysis of the Epidemic as it has occurred in this city. I have already stated the circumstances under which the irruption took place, and without adverting to what may be regarded as its statistics, I shall proceed at once to detail its phenomena, and shall begin with

A *general description* of the disease. The disease first presented itself on the 27th of June, and attained its height about the 20th of July; after which it declined till the first of September, when it again increased, though not extensively. It has long been remarked in other countries, that the Cholera makes its attack in the night, and particularly towards the approach of day. I think it has so happened in New-York in a majority of cases; and the next period most common is in the morning soon after breakfast, and the next in the afternoon. I allude, of course, to the accession of the malignant symptoms, which is generally al-

most instantaneous. The patient is suddenly disturbed with a sense of nausea, and oppression near the region of the stomach, or of exhaustion or vacuity at that organ, and there immediately follows a movement or a commotion of the bowels. A feeling of coldness invades the whole body, though rarely exceeding chilliness. Vomiting and purging now occur simultaneously, and if diarrhœa had previously existed, the evacuations from the bowels exhibit the appearance of rice water, in which is diffused a moderate portion of flocculent matter, that soon subsides to the bottom of the vessel, leaving the fluid more like the appearance of common water. The nature of the first ejections from the stomach will depend on the ingesta that may remain in that organ, and subsequently they assume the appearance of the dejections. This intestinal commotion is attended with various degrees of pain or distress, or sometimes there only arises a feeling of exhaustion, and the prostrating effect from vomiting. An insatiate thirst ensues, which becomes more intense and annoying as the disease advances. The next symptoms in the order of succession, are a general languor, and incipient listlessness. The pulse begins to contract, and increase in frequency. The skin is losing its natural warmth, the nose becomes cold, and the patient either complains of increasing rigor, or admits its existence. He now seeks repose, often feeling some vertigo, or replying that he hears a buzzing, or noise. The abdominal muscles are found contracted, and sometimes

feel like a board, though no spasm exist. At other times they are doughy or are natural. A sense of tenderness is sometimes, but not severely felt, and the abdomen may generally be pressed without producing uneasiness. Locomotion is impaired, but the patient is often able to walk till near the extinction of life. Spasms soon begin to ensue, affecting particularly the muscles of the feet and toes, but often the corresponding muscles of the upper extremities, and sometimes those of the body, though more rarely the muscles of respiration. The pulse now becomes smaller and more accelerated. Perspiration breaks out on the skin, and every effort at vomiting increases its profusion. The temperature continues to sink, and the thermometer now evinces a general interruption of the calorific function. Restlessness increases, and jactation begins. The skin is becoming corrugated around the fingers and hands, and the same appearance is often remarked on the feet and toes. This symptom frequently increases till it exhibits the appearance of great emaciation, the skin lapping in folds. The countenance, which had become anxious, now assumes a pathognomonic expression. The features contract, but are less hippocratic than observed in the East. The eye partially retreats, and the nose is pinched. Listlessness has now grown into indifference, and the attention of the patient is only arrested by suffering or by an inquiry. Abdominal distress increases or supervenes. Respiration becomes more and more embarrassed, and sighing comes

in to its relief. The countenance assumes a uniform leaden hue, or extravasation of blood converts it to an African complexion. The skin preserves its sensibility, but its irritability is almost extinguished. The patient is often aware of its coldness, though he frequently complains of heat, and stimulants applied externally will often act as soon on his sensibility as in health. But not so the irritability; there is no inflammation from the most potent of the ordinary applications, and it is even with difficulty that any vascular excitement can be produced. The thirst which existed from an early period, is now importunate, and induces more complaint than any other species of suffering. The tongue is generally coated in the centre, and clean at the tip and edges, and almost constantly moist, and becomes colder and colder as death approaches. The breath announces the same subsidence of internal heat, and the hand is chilled on the extremities, while it sometimes burns when applied to the region of the epigastrium. If this language be strong, it is intended to convey a sense of the contrast which can be in no other way imparted. The voice becomes guttural and feeble, or is depressed to a whisper. The secretion of urine has been suspended from the invasion, and the patient will sometimes advert to the circumstance when far advanced in the stage of collapse. If the spasms continue, he will sometimes insist on walking for his relief, when every other symptom announces the near extinction of organic life. If

blood have been taken after a full developement of the disease, it is unusually dark and is obtained with difficulty. The pulse becomes tremulous,—it is no longer felt,—the action of the heart is only known by the stethescope,—respiration is performed by the voluntary muscles, and yet the mind tranquil and almost undisturbed in its functions, till absolute death severs the connexion.

These phenomena represent the common progress of Cholera Asphyxia when it advances without interruption to a fatal termination. It will be seen that they are nearly parallel with those which have characterized the disease in Europe and Asia. Some of the symptoms have been, doubtless, modified by climate and other accidents, which it will be the remaining object of this letter to illustrate; but their coincidence is so remarkably striking, that we contemplate the disease with the greater astonishment. In the early part of September, the Cholera, after having subsided for several days to some 20 or 30 cases, again increased, and became more sudden in its invasion. It was often unaccompanied by any of the former "premonitory symptoms," but its victims were frequently struck down at a blow, and became immediately pulseless. Such patients were unsusceptible of any action from remedies, and generally perished in a few hours. They afforded examples of the true and unmixed character of the disease, and very distinctly illustrated its identity with the Asiatic epidemic. Jactation, and oppression at the præcordia, were also remarkable symptoms in such

cases. There was no tenderness of the abdomen, and but little or no pain accompanied the purging.

When the second stage, or that of reaction took place, there was a simultaneous abatement of the most appalling symptoms. The pulse began to rise and the features to expand. Purging and vomiting had ceased. The production of heat was again taking place; the urine began to flow; and if local disease did not supervene, the phenomena indicated returning health rather than a violent conflict of nature. Still the recovery was slow; and the increasing fur on the tongue, the morbid state of the secretions and their gradual improvement, denoted a recovery from some severe convulsion.

The varieties which have occurred in the symptoms of Cholera in this city, have been less remarkable than such as were noticed in Asia. The prominent features of the disease have been more uniform, though some of them have slightly varied from the epidemic of the East. The collapse of the features has been less remarkable here, and very frequently absent; and so also has been the lividness of the countenance, although that was less frequent in Asia than commonly supposed. The absence of vomiting or purging, or both conjointly, was more frequent in the East, and spasms are less violent and more partial here, and more easily subdued. I may add, too, that our disease is much more fatal.

The developement of the constitutional symptoms is generally sudden here, as it was in Asia;

but it is almost constantly preceded by diarrhœa; which seems to be only connected with the predisposition to the general disease, as it may have proceeded from a common predisposing cause. But this diarrhœa is evidently very often of a more artificial nature, and owing much to the habits of the individual. I have hitherto stated to you my opinion of its local character, and that it is in no respect a symptom of Cholera, till it may have become an exciting cause of the constitutional disease; and till then, that it is susceptible of easy control. The discharges attendant on this preliminary state of the bowels are generally different from those which are considered almost characteristic of Cholera, and denote a different mode of action. They are also usually coloured with bile, and if they become watery, it is a circumstance which invariably attends common diarrhœa of considerable duration. If this preliminary diarrhœa, therefore, was rarely observed in the East, its absence does not affect the very great identity of the disease. It was a prominent symptom of the collapsed Cholera, and the evacuations at once exhibited the failure of the bile, which is not often noticed among us till the same general condition of the system supervenes; a circumstance which appears rather to favour the belief of an entire coincidence. It happens, however, that this premonitory diarrhœa is sometimes complicated with an antecedent disease, either functional or organic, and may be consecutive or accidental. When the

previous derangement has been merely functional, it requires a close investigation to determine how much is to be ascribed to the predisposing cause of Cholera; but the history of the case may disclose some previous affection of the digestive powers,—some congested state of the liver,—or some other derangement almost unobserved from its slow accession, but now aggravated by a choleric atmosphere, and has become the source of some sympathies, which may be mistaken as indicative of the predisposition that soon results in Asphyxiated Cholera. Again, very nearly the same phenomena will proceed from the malign constitution of the air, and are essentially connected with the formation of the specific disease. An attention to the case will enable us to distinguish the causes and the nature of these morbid conditions. To confound them is sometimes fatal to the patient, and it is better to give them the worst construction when any doubt may remain. I have repeatedly witnessed, during the prevalence of Cholera, congestions of the liver and some corresponding affection of the mucous membrane of the stomach and bowels, which evidently proceeded from some previous dyspeptic malady, or from the influence of hidden causes, existing perhaps in the atmosphere. These cases have been more or less distinguished by a slow or accelerated pulse, sometimes slow and contracted, and again full and quick and frequent, and in either case sometimes intermittent or otherwise

irregular. Corresponding conditions of the skin have been attendant. In the former instance, it has been cool and rather dry; in the latter warm or hot, moist or husky. The urine has been deficient, red and irritating. The head painful, or a tightness of the brow, and soreness and stiffness of the eyes. The countenance pale and sallow, or flushed and inanimate. The tongue coated in various degrees, generally more extensively than in Cholera, and commonly of a yellowish tinge, or a dirty white. The mouth rather dry to the patient, and the taste altered. Indefinite pains occur in the limbs and the body. There is often some tenderness and throbbing at the region of the stomach, or a sense of exhaustion from pressing on that organ. The appetite is impaired, and a little food produces fulness. The bowels are constipated, and catharties are of slow and difficult operation, unless preceded by ample blood-letting. The dejections are rather black, or green, and intermixed with mucus; or if salts, or senna, have been given at an early period, the evacuations were watery, and might be mistaken for rice water. The uniformity of temperature is often disturbed, the feet being unpleasantly cold. Muscular strength is variously impaired, and the patient seeks rest and retirement. His spirits are depressed, and he becomes impatient for relief.

Such is the most common form of disease next to diarrhœa, that has occurred to my observation during the prevalence of Cholera. It readily,

though slowly, yields to our remedies, and we have therefore no opportunity of seeing it degenerate into Asphyxia. It is constantly seen in this climate, and has not been at any time excluded. I am sensible it has been regarded as a part of the reigning epidemic; but my conviction is opposed to that opinion. That it may become the exciting cause of Asphyxiated Cholera is undoubtedly true; and that symptoms considerably analogous constitute the accession of that disease, I think I have sometimes observed. They are, however, of brief duration, and are scarcely known to the physician, but by information from the friends or the sufferer. Collapse has supervened, and we commonly meet the case presenting the phenomena I have described.

The symptom by which the disease is most distinguished, and from which it has derived its specific name, is invariably attendant, and occurs under the same modifications which have been noticed abroad. The pulse generally becomes contracted and accelerated soon after the invasion, and if the disease be not complicated with previous inflammation, it is never hard. It is especially influenced by vomiting and spasms, and by sighing, and by voluntary motion. It is more remarkably depressed by the former; becoming even imperceptible, as is frequently observed in the spasms of hysteria, than increased in volume by the latter. As these causes cease to operate, the pulse again resumes its character. Its frequency increases as the disease advances, and

there is a corresponding diminution of its volume. These phenomena, in a majority of cases, go on in a progressive ratio, till the pulse can be no longer distinguished in the extremities. At other times it becomes irregular, though still frequent, and its motion is often tremulous, and the pulsations cannot be counted. If the ear be now applied to the region of the heart, its action may be found to be perfectly distinct, and not exceeding a hundred and thirty or forty pulsations. This want of synchronism is remarkably striking in some subjects, and when it exists, the pulse sometimes becomes obedient to the action of the heart, as the disease marches on. It does not seem to arise from any accidental occurrences, but is obviously a contingent symptom of the disease, and I believe invariably a fatal one. Again, the pulse is not remarkably affected at the invasion, and only assumes the choleric character after a full developement of the other symptoms. The average frequency of the pulsations from the time of the attack, and while the pulse remains distinct in the extremities, is from 100 to 130. The pulse is rarely intermittent, as distinguished from irregular. It may be commonly felt in a very attenuated state till near the extinction of life; or sometimes it wholly disappears, and is reproduced by artificial means, or returns without any apparent cause. It had rarely happened, however, that the patient lingered beyond three or four hours after all pulsation has ceased in the radial artery, until a modified type of the disease was observed after

the first of September. I had known only two parallel instances to those recorded by the Anglo-Asiatics, in which death did not supervene till two or three days after the disappearance of the pulse; in one of which, the patient lingered four days without pulsation at the wrist, and the other, three days. I have since seen two similar cases, through the politeness of Dr. Lee; in one of which, a very respectable lady of robust health became pulseless soon after the attack on the 6th of September, and remained so for 58 hours. The temperature of her mouth was 96 degrees for 30 hours after pulsation had ceased. She also passed urine involuntarily several times during a period of more than 38 hours of perfect Asphyxia. She had no sweating, and her tongue was nearly clean, though rough and rather florid. The purging had been profuse, no vomiting, and spasms very slight. Her skin was leaden and warm, thirst intense, and countenance anxious. The pulsations of the heart were 136, thirty hours after the symptoms of Asphyxia had taken place. During all that period she was perfectly intelligent and very colloquial, conversing in a most interesting manner. Her voice was hoarse and unnatural. Thirty-eight hours after Asphyxia, the temperature of her mouth stood at 98 degrees, and the pulsations of the heart were 140. At fifty hours the temperature was nearly the same, body warm, extremities cool, surface livid, features not collapsed, no wrinkling of the skin, no sweating, purging continuing, action of the

heart more accelerated, no sleep since Asphyxia, sordes collecting on the teeth, and delirium had existed for twelve hours. Was still able to jump from her bed. Respiration nearly natural, and breath warm. At fifty-eight hours, respiration laborious, action of the heart inaudible, temperature of the mouth 90 degrees; over the entire hypochondriac regions the thermometer stood at 106 degrees, the temperature of the room being about 74 degrees. Extremities cool, not cold, comatose. Skin of a deep leaden colour. Passed her water at fifty hours, but whether afterwards is not known. As late as fifty-three hours after the cessation of the pulse, it required considerable strength to confine her to the bed. She died twenty minutes after the last record of her symptoms.

The case was treated principally by calomel and Dover's powder. Fatigue, and a cathartic taken without advice, were the exciting causes.

I shall subjoin another of these remarkable exceptions from the ordinary form of Asphyxiated Cholera, which fell under my observation.

Mr. A., a patient of Dr. Lee's, resided at No. 142 Christopher-street, a respectable butcher of prudent and temperate habits, aged about 50 years. He was seen by Dr. Lee at 10 o'clock of the morning of the 7th of September. He had been affected with diarrhœa during the summer, and was attacked with collapsed Cholera on the night of the 6th. The discharges suddenly became profuse, and were unattended with pain. There had been

no vomiting, nor did that symptom, or even nausea take place at any subsequent time. No chilliness, nor muscular pain, nor much oppression. Dr. Lee found him without pulse, and the temperature of his body natural. I saw him first with the Doctor at 6 o'clock on the evening of the 8th, at which time his symptoms were said to be the same as on the morning of the preceding day. His countenance denoted nothing but health, save a vacancy of the eye. It was covered with a natural flush, and the cheeks were pleasantly warm. A slight shade of blueness appeared on the body, and extremities, which were but little cooler than natural. The fingers were assuming the square form, but were without wrinkles. The veins collapsed and the skin lost its elasticity. No perspiration, nor any unnatural dryness of the skin. Temperature of the body and extremities but little lower than natural. In the mouth the thermometer stood at 95 degrees. The pulse entirely insensible, and the action of the heart very feeble; its pulsations 92 in a minute. Had one slight spasm in the leg the day previous. Passed his urine frequently and freely, of a yellowish colour and generally without volition. Purging was arrested the preceding day, and had scarcely returned. The dejections were watery and without smell. No tenderness of the abdomen, no sense of oppression, but little thirst, drank moderately, but ad libitum, and without inconvenience. Tongue moist, slightly coated with a whitish mucus, and rather pale. Muscular strength considerably im-

paired, and at this time, he required assistance in turning. Voice altered from the time of the invasion, being hollow and feeble. Spoke with effort and reluctance. Intellect entire, but great listlessness and indifference.

He died at 2 o'clock on the following night, without any return of purging, or any suffering, having been without pulsation 40 hours from the first visit of his physician. Eight hours after death, the temperature of his mouth was 78 degrees, and over the epigastrium 84, that of the room being 72 degrees. His skin was not livid, and there was still a slight flush of the face.

Calomel was the principal remedy.

After the 1st of September the Cholera again extended and increased in malignancy; I had at no time known it to present a more formidable aspect, and it has occurred in many instances without any "premonitory symptoms," and sometimes without any apparent exciting cause. From that period, I have seen the pulse extinguished, in many cases, at the very invasion, and not again returning, the patients expiring in four to twelve hours after.

The superficial veins are flattened from an early period, and the blood, which flows from them in bleeding, seems not to be restored, or but very gradually. Hence it is nearly impossible to obtain much blood, in this manner, from a collapsed subject. It runs freely for a short time only from the temporal artery, and is obtained with great difficulty by cupping and leeching. In

Asia large quantities of blood were often abstracted from the veins of collapsed subjects, but always with difficulty. This symptom will not affect the identity of the disease, if we advert to the far greater integrity of the blood in the East; and the infrequency of premonitory diarrhœa. It is always particularly dark from the veins, and in consistence more than naturally thick. These phenomena are observed to increase as the disease advances, and, I believe, they are uniformly present. I have heard of no instance in which the blood flowed readily, or in which it was not in some degree discoloured, at whatever period abstracted. It has very generally happened that the blood has coagulated slowly and imperfectly, and often not separating into its component parts, unless drawn into a vessel best adapted to promote that investigation. The coagulation, however, will be soonest and most perfect as the blood may have been abstracted near the time of the invasion, and it is liable to be influenced by previous diarrhœa, &c. It is deprived of its serum in proportion to the duration of the disease, and the premonitory diarrhœa, and this appearance occurs where the purging and vomiting may have been very slight. In those cases the watery portion had escaped by the skin, from which the perspiration runs almost in a current. However carefully abstracted, there is no buffiness, or scarcely a pellicle of lymph on the surface. In the East, the blood coagulated quickly, and the difference is easily explained

without affecting the identity of the disease. The evacuations were less profuse, and there having been little of our antecedent diarrhœa, the blood was less exhausted of its serum, and some other component parts,—a circumstance which must materially affect the sensible phenomena of that fluid. Thus, too, is explained the greater success which the Asiatics derived from blood-letting, than has been enjoyed in Europe or America. The remedy was there applied before the blood was bereft of all but its crassamentum, which has been with us but the poor remnant on which despair has sometimes seized; or if in a few solitary cases, the fluids have yet remained in the system, and some determined hand, well directed by the lights of science, has promptly liberated the circulation, it exemplifies the feeble assistance which is afforded by nature when she has thrown off the principles of the blood, and affords another analogy between our own and the Eastern epidemic. In these rare cases, I am told, what might have been expected, that the blood soon becomes more florid, and flows more and more freely.

The colour of the blood does not appear to be much influenced by the manner in which respiration is performed. The mechanical part of this function often appears to go on well after pulsation has ceased, and the skin become livid. Neither do the secretions affect the colour, which appears to depend on the period of the collapse.

I cannot doubt, that the colour results in a great degree from some interruption in the organic functions of the lungs, and to which I adverted in a former letter.

Dr. Gale, who kindly favoured me some time since with a few results of his experiments on the blood, and which are noticed in one of my former letters, has more recently detected the existence of an oil in a free state in every part of the vascular system, and which I have since had opportunities of witnessing in dissections. It is sometimes very conspicuous, and resembles olive oil. It abounds most as the patient approaches death.

The difficulty with which the blood is abstracted from the veins is never owing, directly, to its thickness, but to the interruption in the circulation. Its consistence, although obviously increased, has probably been overrated by authors.

The varieties which occur in the *Purging* are not numerous. Notwithstanding this evacuation has been abundant during the antecedent diarrhœa, it becomes still more profuse when Cholera is developed. The quantity is sometimes surprisingly large, amounting to more than fifteen quarts in twelve hours. This is probably the largest estimate, and in such instances there has been comparatively little vomiting or perspiration. Some rare cases have occurred in which this symptom and vomiting have been absent. The discharge takes place without much, if any, pain, and is unattended with effort. In a plu-

rality of cases it occurs without volition, after collapse is fully formed, and does not attract the notice of the patient, though at an earlier period the impulse may have been strongly and irresistbly felt. The fluid is ejected very variously, often with violence, rarely appearing like the action of cathartics. The patient sits for a moment on the pan, and we are astonished when he rises, to observe the quantity discharged. Again it runs away slowly, or there is merely an oozing. It is attended by an expression of great exhaustion, and is felt by the pulse. It continues, if not arrested by art, till near the close of life. The sensible properties of the fluid evacuated are such, almost uniformly, as I have described. Sometimes it resembles dirty water, and more rarely presents a bluish appearance. It occasionally exhibits more of a milkiness, than of the rice water; but in that case a precipitate takes place, and leaves a colourless serum. I have seen two fatal instances in which a deep greenish yellow bile was vomited and purged till near the extinction of life. The surface was livid and the pulse as usual in Cholera. They are very rare exceptions. In a few instances at the hospitals, there has been seen the reddish appearance like the washings of beef, as described by authors. In these cases there is more abdominal suffering. The discharges from the stomach and bowels are nearly alike. The dejections are generally inodorous, but are very rarely attended by a strong and offensive

smell. Excessive discharges constitute a hopeless case, and the most malignant have been now and then unattended by any. They are generally easily arrested by appropriate means, and consequently it does not long remain a symptom after medical treatment is applied. From the abundance of fluid, however, which is frequently found in the canal, I have no doubt that the secretion often goes on, notwithstanding its discharge has been arrested, and continues to exert an influence on some of the other phenomena. The discharges are occasionally the obvious result of affections of the mind. Fear, particularly, will suddenly excite profuse evacuations; but how far its action extends to the organic functions is doubtful. The secretion may have been already produced, and the muscles alone have felt the impulse. It need not be said that purging is an earlier symptom, and is entirely more excessive and uniform than vomiting. I do not know that it has ever been absent where vomiting has appeared.

In India this symptom occurred only during the collapse; it was then excessive and of short duration. In New-York diarrhœa has generally pursued the patient for some hours or days, before the constitutional disease is developed; then becoming even more severe than at the East, and continuing with greater pertinacity until arrested by art.

Vomiting is comparatively infrequent with the purging, but occurs early among the symptoms of collapse. It often subsides spontaneously,

especially if the stomach be not irritated by drink. It aggravates the thirst, but is not connected with its production, so that no relief can be obtained from fluids. The ejection is not attended with much pain, but is often effected with severe efforts. The ingesta, however, are not always entirely thrown off. It never occurs without purging, and is much more easily arrested. It is always aggravated by cold or hot drinks, unless in very small quantities, and affections of the mind will produce it. It is also protracted and rendered more obstinate by emetics. It is very frequently wanting, and cannot be regarded as a severe symptom of the disease. I know not that the case is more favourable from its absence. The fluid is sometimes discharged in large quantities, and generally resembles the dejections. Again it is in small quantities, and thrown up with greater effort, being more like the natural mucus of the stomach. It is not infrequently tinged with green, sometimes bluish and very rarely yellow. I have seen it ejected in large quantities of a deep greenish yellow, when the patients were far advanced in the worst varieties of collapse. The exhaustion from vomiting is greater, but less permanent and extensive than from purging. It does not appear to affect the state of the skin in respect to perspiration. It seems not to be influenced by temperament, or sex, but is evidently more connected with the habits of the individual. I have seen it occurring during the violence of the epidemic, as a symptom of our

indigenous cholera morbus. It was then more obstinate, and attended with bilious discharges. The diseases presented striking dissimilarities.

The most remarkable condition of the *skin* is the impaired state of its *irritability*, while its sensibility is not much diminished. Simple irritants, however active, do not produce their ordinary effect. Cantharides, ammonia, &c. are perfectly powerless, and the chemist is consulted for combinations that shall evolve more active principles. These, too, fail in their turn, and we resort to fire and boiling water as the last resource of art. But the patient will not even always burn —save in his sensibility, which pleads as piteously as in the fulness of health. The mustard cataplasm soon becomes a source of great annoyance, and Rhinelander's ointment sometimes produces expressions of great suffering. Still the marble coldness remains, and vascular action is as dead as ever. There is something characteristically striking in this state of the temperature. It is the coldness of death, and if the skin be wet with perspiration, a chill is imparted to the touch. This absence of heat is often confined to the extremities and face, though generally existing in an inferior degree over the greater part of the body. It is frequently preternaturally great at the scrobiculus cordis, where I have found it accumulated in a dying choleric at 106 degrees. I am informed that in two cases at the Greenwich Hospital, the heat of the skin was almost natural till death. In those instances the pulse was very indis-

tinct during collapse, and there was no sweating. In the case of the lady to which I have alluded, the temperature of the whole body was preserved without a parallel. I have never remarked an increase of the temperature as the extinction of life approaches, excepting at the region of the epigastrium; where it sometimes acquires a great exaltation just before death; but after death the general surface often becomes warmer. I ascribe this circumstance, not to the production of heat, but to the cessation of the vital laws, which enables those that govern dead matter to operate, and to equalize the caloric already existing. The coldness of the skin is increased by sweating, but is less so than would be inferred, *à priori*. It is also increased by purging, but not in a remarkable degree. In adverting again to the loss of irritability, we are sometimes astonished that boiling water will produce no vesication, when it is known to vesicate other subjects if applied immediately after death. It would be folly to contend that the living man is more dead, than he who is defunct beyond all question. This phenomenon can be only explained by recognising a peculiar morbid condition of the skin, in which its organic properties are so changed, that they have entirely lost their natural susceptibilities; and it is another argument against the principle of sympathy, and in behalf of constitutional disease.

Sweating has been a very variable symptom. At the irruption of the epidemic, it was most universal, and became less uniform after its decline.

From the 1st of September it was absent in a majority of cases, and less frequently attended those subjects who were pulseless from the attack. It occurred in various degrees, from the most profuse, to an insensible transpiration, the skin being rarely preternaturally dry. It was always cold, and rather clammy; but in subjects transfused, it was suddenly increased in quantity, and its temperature exalted to a hundred degrees. Its odour was strong, and so very characteristic, that the disease could be known by the smell. It was most abundant when purging was least, but they occurred in connexion to an excessive degree.

The skin, in all subjects, lost its *elasticity*, and if pinched, would slowly resume its former condition. A remarkable appearance was its corrugation and folds on the fingers and toes. It occurred under every aspect of the disease, and was more or less present in a great majority of cases. It was seen in subjects where purging and sweating were not severe, but most so, where the latter was excessive, and it often happened in the entire absence of sensible perspiration. It was less conspicuous on the toes than the fingers, and often involved the entire hands and feet. A flattening of the four sides of the fingers was first observed, producing a squareness of shape. The folds then succeeded, longitudinally on the front and sides, and tranversely on the back; and if they became numerous and large, the squareness of the fingers became less distinct. If sweating were profuse, the fingers and toes were greatly reduced in size,

and the skin was remarkably corrugated. This corrugation appeared to arise from three causes; in part from the direct morbid action of the skin, from sweating, and from other evacuations. The limbs did not exhibit an appearance of emaciation.

The *colour* of the skin was less uniform than many other symptoms, but was affected in a majority of subjects. The prevailing hue was leaden, and like other varieties, increased with the progress of the disease. It was not commonly most obvious about the eye, as has been elsewhere noticed, but existed in an unvarying shade over the surface. If there were congeries of varicose veins, they exhibited dark patches. This tint, more than any other, increased the cadaverous expression. Next in frequency were various shades of blueness, and this occurred in most instances of sweating, the leaden colour being more peculiar to a dryer state of the skin. It abounded most on the nails, hands, feet and face, particularly the lips, but did not especially exist around the eyes. It was also diffused in a lighter shade over the body, and was remarkable on the contracted scrotum. When the sweating was excessive, the hands would sometimes lose the colour and become blanched, especially the palms, the nails remaining blue. A still darker hue was frequently observed, occurring on the body and limbs in large and small patches, and covering the face entirely or partially. It would sometimes recede, and again appear, and was often influenced by the spasms. It would sometimes subside before

death, and return in a short time after; or it would disappear soon after death, and reappear on the upright part of the body within an hour or two. A still darker hue, approaching the African colour, was more rare and owing to extravasated blood. I have seen it covering nearly the entire surface of the body.—It was connected with cases of great malignancy, and in which the spasms were violent. A deep brown and a leaden colour frequently occurred around the eyes, but when it was distinct there, it was scarcely observed on the face. In a large proportion of cases, there was no striking change of colour, and in some instances of most perfect Asphyxia, the countenance was florid as in health. The nails were often curved, when the fingers were much shriveled.

The *countenance* of a choleric can seldom be mistaken, notwithstanding the variety by which it is distinguished. It is not, however, generally, the cholera countenance of the Asiatics; and perhaps in no feature of the disease does there exist a greater disparity. At the irruption of the epidemic I saw many cases presenting the true collapsed, shrunken features, described by oriental writers, but they have been less common since. They were attended by the whole array of the worst symptoms. In most instances there occurs some sinking of the features, particularly of the eyes, the expression of which is differently affected, being generally dull, and very rarely presenting the dim and opaque appearance that was so constantly noticed in the East. This organ is fixed, and

moves only when excited by some mental or physical impression; but seems as ever sensible to the light, of which the patient sometimes complains. There is scarcely any winking, and thus far the combination represents the inanimate statue, which derives further effect from the stillness of all the facial muscles. If the patient sleep, it is with his eyes nearly open, and the lips parted. Sometimes the eye acquires an unnatural lustre, but with the same appearance of vacuity; and this will remain a very striking object for two or three hours after death,—slowly fading away. Such cases are attended by severe spasms. The pupil exhibits every variety of contraction and dilatation. Petechiæ sometimes appear on the sclerotic coat. I have never seen the "cornea apparently covered with a film."

In a majority of subjects the cheeks are rather moderately sunken than collapsed,—rarely as much so as in bad cases of cholera morbus. The nose is more pinched, and especially so when the alæ are concerned in the respiration.

Again, there is scarcely a perceptible sinking of any of the features. They are, however, all quiet, and the inanimate eye is sufficiently characteristic. Rarely, there is a natural flush, and an expression of health, and nothing to denote the near extinction of life, save the never failing spiritless eye: The expression evidently depends in a degree on the intellect and habits of the individual.

A particular coincidence has occurred between the *spasmodic affections* of our cholera subjects

and those of the East. It is with us, however, a more common symptom, existing in at least three fourths of the cases: Of all the symptoms it seems to denote more than any other a primary impression of the morbific agent on the nervous system, and that its influence is thus, in part at least, propagated to other organs. It is, however, but an isolated evidence, and rests on its frequent occurrence as an early symptom of Cholera, and the fact that it existed merely as a symptom in many people in the enjoyment of health, especially during the increase of the epidemic. It was sometimes late in its appearance, and was entirely most violent, where the purging and vomiting were most severe. It was most so in the robust, especially if intemperate,—and more so in males than females. In children it was rare or slight. It was generally confined to the voluntary muscles, though it affected those of a mixed nature. It was sometimes detected in the muscular coat of the large intestines after death, which were found greatly contracted. In those cases the voluntary muscles were also affected. The muscles of the feet and toes, and the gastrocnemii, were the first in order of frequency, and next those of the hands and fingers. Then follow those of the arms and thighs, from which the spasms extend to the abdomen and more rarely to the chest. The diaphragm appears to be often affected with tonic spasm, from the manner in which the thoracic muscles become interested in respiration; it is rarely, if ever, affected with the clonic variety, and

I have never witnessed an instance of hiccough of more than momentary duration. The contractions of the diaphragm are attended with distress, not with pain. The fingers and toes are distorted in every direction, and the limbs are sometimes thrown about with considerable violence. Then again this species of spasm suddenly subsides to the fixed contraction, or they exist in connexion, even affecting parts of the same muscle at the same moment. This coincidence I have particularly noticed in the gastrocnemii. The muscles of the abdomen are chiefly affected with the tonic spasm, by which the parieties are brought into permanent contact, and a singular hardness is the characteristic result. The body is rarely distorted in consequence, but occasionally the clonic spasm doubles the sufferer. The muscles of the eye, I believe, are never affected, at least with the clonic species, nor those of the eyelids, and very rarely the facial muscles. Those of the neck are more liable to convulsive twitchings. The thoracic and abdominal muscles were sometimes affected, in connexion, with tonic spasm. The bladder was evidently rigidly contracted in most subjects, which appeared to be rather the result of spasm, than its natural tendency to contract.

The greatest suffering attended the contractions of the simple voluntary muscles, especially the gastrocnemii, in which the pain was generally very great; evincing rather an exaltation than "diminution of nervous power." The affection of these muscles was very similar to that

which occurs in hysteria;—rarely, if ever, like the movements in convulsions or epilepsy. There was no pain, but sometimes distress, attending the tonic spasm of the muscles of a compound nature. I am not informed whether there was any unusual suffering in the abdomen of the few in whom the large intestine was found contracted. Affections of the mind not infrequently excited the spasms.

This species of suffering would often produce great jactation, and the patient would even start from his bed in pursuit of relief.

Respiration was less laborious, than would be inferred from the embarrassed circulation in the lungs, the action of the heart, and the tonic spasm which frequently seized some of the muscles concerned in the process. Whenever the spasm attacked the abdominal muscles, it was obvious from the great labour of the others; and if the diaphragm became its subject, it was denoted by a great elevation of the chest, and the action of the alæ of the nose; and again the abdominal muscles especially participated. These varieties were frequently presented and were well marked. This function was generally slowly performed, and sometimes particularly so,—especially if there existed a determination to the brain. It was rarely attended by great distress, though it was frequently apparent that the patient was oppressed; a sensation next to thirst that created the greatest restlessness. The patient would lie for a short time in a state of apparent ease and abstraction,—then suddenly turn with a sigh, or a moan, throw-

ing the covering from him, and was again at rest till the same process was repeated. The admission of fresh air relieved the jactation. The breath became cool at an uncertain period of the disease. It was almost a uniform and striking symptom.

The *Voice* was affected in most of the subjects; but its tone was variously modified. In some it was hollow and sepulchral,—in others it became flat, and oppressed, and again it was a whisper, or it was quite inaudible. At other times it was hoarse and rough, and in a few it continued natural. The patient generally spoke with effort, but was sometimes very colloquial. I have only remarked a disposition to converse in the intelligent and well informed; and in those instances, speaking did not appear to produce exhaustion; and was performed without difficulty when the voice was distinctly audible.

I have formerly remarked, that no indication could be derived from the state of the *tongue*. If premonitory diarrhœa had existed, in a majority of instances the tongue was coated in the centre of a dirty white, and clean at the tip and edges. In other cases this coating was more extended, superficial and lighter. Again, it was merely a sliminess which was easily detached, and soon returned. When presenting any of these conditions, the coating has been more dense and extensive during the existence of the antecedent diarrhœa,—the irruption of Cholera so modifying the action as to change the aspect of this condition of the organ; and it often continued de-

creasing during the progress of the disease. Under these circumstances the colour of the tongue was paler than natural, and the mouth was moist. In other instances a slight frosting appeared, like minute particles of sugar, through which a more florid and dryer tongue might be every where seen. Again there was only a roughness of the surface, resembling a coarse file, when the tongue was also florid and deficient in moisture. Or it was perfectly smooth and reddish and moist, presenting the aspect of beef; or it was clean and livid; or it might be in every respect perfectly natural. I never saw it coated to any remarkable extent, and should consider a dense coating favourable. It approached its natural character most in those subjects who had been attacked without the common premonitions, and was always formidable. The mouth was almost constantly moist, though sometimes approaching a state of dryness. A dark sordes would often accumulate about the teeth just before death.

There was no symptom attending the tongue and mouth so uniform as the reduction of heat, and which I believe always occurred for some time before dissolution. I had always a thermometer with me, and applied it in a great number of cases, being careful that the patient had not drunk just previously. It was also an early symptom, and while pulsation existed in the radial artery it averaged about 92 degrees. Soon after the invasion it descended to 96, and progressively sunk to 86 or 88 degrees, when life

became extinct. The lowest temperature I have observed was 81 degrees, in a dying subject. I have frequently found it 85, near the extinction of life, particularly in protracted cases. In one instance, in which the disease attacked without any premonitory symptoms, I found the temperature in six hours after at 84 degrees, and pulsation still existed; and in another, under exactly the same circumstances, it stood at 86.

At 94 degrees it became what is called a "choleric tongue," and was sensibly cold to the touch. At this temperature, also, the breath imparted a feeling of coldness, and injections came away with the same property. The accumulated heat at the epigastric, or the hypochondriac, region, did not affect the temperature of the mouth or the bowels. As it augmented in one, it diminished in a corresponding ratio in the other. These phenomena, and the coldness of the breath, contrasted surprisingly with the intensity of the thirst; but that I apprehend was owing to the morbid state of the stomach. I do not ascribe it to the accumulated heat around that organ, where I doubt not it existed within the cavity of the abdomen, in some instances at more than 112 degrees. I once examined a subject with Dr. Ludlow in 15 or 20 minutes after death, in which I have no doubt that temperature existed, as I think also, it must in the dying patient in whom I found the heat on the surface at 106 degrees. Neither do I believe the sense of heat or burning in the region of the stomach is connected with

this exalted temperature. It is not a common complaint, and I have heard it equally made, when the surface of the epigastrium was cool. The patient was never disturbed by the introduction of the thermometer into his mouth, but would generally contribute some assistance.

The *Glandular Secretions* have been suspended in the same remarkable manner that has been every where observed; particularly of those organs which are most concerned in the functions of life. I have generally found scarcely a trace of bile in the liver, and the vesicle containing about the quantity which we find in subjects of other diseases. The same extinction of this function of the liver is equally denoted by the absence of bile in the discharges, with the few exceptions of which I have formerly spoken. When bile has been discharged during the progress of fatal collapse, it has exhibited a greenish appearance with a tinge of yellow, and has existed in abundance and without smell. There was no urine secreted in these cases. They were as malignant as the majority.

I have only seen two cases in which the urine was passed during a protracted collapse, and in which the patients were pulseless from the beginning. These cases occurred in the private practice of Dr. Lee, and are the two to which I have before adverted. It was a very rare attendant.

I now approach the condition of those organs which are especially connected with the great

nervous system, and in which we should expect to find the most indisputable evidence of disease, did it consist in a "prostration of nervous energy." The great centre itself of sensibility gives no token that its energy is much impaired; but in presenting you with a faithful account of the varieties which occur, I must not neglect to say, that absolute insanity has in very rare instances taken place, when no trace of morbid action could be detected in the brain on dissection. At other times, though not often till the near approach of death, more or less coma has been present; but this has probably arisen, in part, from an impaired state of the senses, some of which are slightly affected in about half the cases. The hearing was more affected than any other sense. But I have never seen an instance of entire deafness. A singing and other noises were often heard, especially by the intemperate, though they rarely complained of the symptom. The sight seemed not to be affected in most instances, though sometimes quite impaired. A transient dimness of vision was not unusual, but subsided as suddenly as it supervened. The taste was evidently more obtuse; but patients generally answered that they tasted the medicine, though they rarely complained, excepting of its irritating properties. I know not how far the smell may have suffered, as the patient was too listless to attend to odours.

It would be but repetition to speak again of the remarkable ability with which locomotion was

performed by many patients; but there were those who became powerless as in a state of intoxication.

I think there is sufficient evidence to show, that the varying affections of the mind and of the senses are not the result of any known morbid action in the brain and nervous system, and that these phenomena are generally less when they do exist, than would be inferred if explained on the principle of sympathy alone. This system, therefore, while it is less concerned than many other organs, in the functions of organic life, seems to exist in a state of particular independence.

The *Prognosis* is always unfavourable in every case of Asphyxiated Cholera, from its beginning. While the symptoms of oppression exist, there can be no other than the most fearful apprehension; and it is only as the vomiting and purging cease, as the pulse begins to swell, and the skin to recover its warmth, that we can encourage the hope of a favourable issue; and even then, the rising strength and hardness of the pulse, the accumulating fur on the tongue, the flushed face, and the injected eye, often denote that the danger is not over. Almost any change of colour in the discharges is auspicious, but particularly as it inclines to the darkest shade, when the odour, often strong and offensive, returns. Still, a putrid smell is bad. The quantity discharged is surprisingly great, contrasted with the little fluid that remains in the system. It assumes a variety of appearances in the progress of con-

valescence from black to green, and thence to yellow. It ultimately seems to consist of concentrated bile, at an early period producing heat and tenesmus; at a later, tormina or slight gripings. If the urine reappear, no symptom is more promising. When the attack is not preceded by diarrhœa, active treatment, early applied, is most successful in such cases, but delay is generally followed by a speedy death. The beef-like tongue is always fatal, and a clean tongue more unfavourable than a coated one, unless occurring without premonitory symptoms. Sordes on the teeth denotes the near approach of death. I have never known a recovery, where the temperature of the mouth has been actually below 94 degrees; and to this inquiry I have given particular attention. Profuse sweating forebodes death. The presence or absence of wrinkles on the skin affords no indication. Danger is great in proportion to the colour of the skin, and the inequality in the distribution of heat. A cold or a sour breath is fatal; great jactation is fatal; and so is coma, or any considerable affection of the functions of the sensorium. If complicated with organic disease of any important viscus, death is certain. The intemperate, I believe, die invariably. Sex has no influence. Old age sinks under the struggle, and children, if recovered from collapse, generally die of subsequent congestion of the brain. It is very difficult to arrive at any accurate estimate of the proportion of recoveries from the asphyxiated disease. The greatest obstacle arises

from the little discrimination that has been made between premonitory diarrhœa, and the constitutional affection, the former being regarded as the first stage of the latter. It is manifest, that a great proportion of reported cures belong to the first class, both in Europe and America; and it is from the success which generally attends the treatment of the diarrhœa, that many worthy practitioners have declared that they are rarely disappointed in the results of their remedies. I think, however, I gave the most favourable construction to this subject in a former letter; and from subsequent observation, I may safely repeat the assurance, that the practitioner is eminently successful who saves one patient in six, if Asphyxiated Cholera be the disease. Truth obliges me to concede that such has been the melancholy result of my own efforts, and I feel an equal conviction that I do no injustice to others, when I impute to them as little success. It should be stated in behalf of the able and devoted gentlemen who have presided at the Hospitals, that they have constantly received the worst subjects of the disease, and often when in a dying condition. Still, I do not believe there has been more honourable experience in private practice.

It is stated on high authority, that the ratio of deaths in Asia was only 1 in 7 or 8, while in Europe it was 1 in 2 in the *asphyxiated stage*. I have no doubt of the far greater success of the Anglo-Asiatics from the absence of antecedent diarrhœa, which enabled them to adopt blood-letting

with so much advantage; but I must doubt as to the proportion of recoveries which are said to have been effected, whether in Asia or Europe. Magendie has said that "Cholera begins where other diseases end," and we find all authors speaking in the language of despair of the asphyxiated disease; save only the projector of some new remedy. Dr. Holmes, of Montreal, writes me that, "in the fully developed disease, scarcely any treatment is of avail; and this opinion coincides with that of the practitioners with whom I have conversed."

Convalescence was slow, and often embarrassed by the developement of topical inflammation, or congestion, observing the following order in respect to frequency; the brain, the liver, the small intestines, the stomach, constituting what has been rather inconsiderately called *typhus fever*,—and that, too, without much reference to the particular organ which might happen to become most involved in the stage of reaction. This second period of the paroxysm was almost invariably attended by symptoms denoting congestion of the liver, and when they did not extend to the other organs, especially the brain, the general phenomena were those of mild febrile reaction, bearing no correspondence with the violent irruption of the cold stage. The constitutional symptoms were more modified by congestion of the brain, when the pulse became full and hard, the skin dry and hot, the tongue dry and furred over, the face flushed and the eye injected, generally stupor, and some-

times delirium, but very rarely restlessness. It was an obstinate and fatal condition of disease. If coma were not soon relieved by blood-letting, the patient gradually sank; but partial relief encouraged its repetition, and frequently with success. Sordes on the lips and teeth was a fatal symptom; so was a small tremulous pulse, protracted respiration, and insensibility of the eye.

Perhaps it may not be unacceptable to advert, in this place, to the mode of practice most successful in the more auspicious terminations of the cold stage, and what are denominated its *consecutive diseases*. When the second period of the paroxysm ensued without any particular local disturbances, it was constantly necessary to act with a reference to many possible consequences,—particularly to the developement of cerebral congestion. But so far it was rather a system of watching than any active treatment. From the functional derangement of the chylopoetic viscera, it was especially necessary to exhibit cathartics of calomel, and castor oil, and to subject the patient to a very *rigid diet*, and the most temperate and salubrious habits. I do not think that any benefit arose from the use of means internally, that were addressed specifically to any one organ,—as nitric ether to promote the secretion of urine, &c. Some very intelligent practitioners have employed Dover's powder, either uncombined, or associated with calomel; but I have thought its tendency was to produce congestion in the abdominal viscera, and subsequently of the brain. If the liver, as not infrequently hap-

pened, became the seat of greater disease, either local or general blood-letting was necessary, and a large blister over the region of that organ. The general principles of treatment were continued.

The brain being more constantly the organ to which the local determinations tended, it was often very difficult to conduct the convalescence of the patient safely along. This complication of the disease was sometimes insidious in its approach, but its full development was well marked, and generally such as I have described. It pursued the patient with great tenacity, and would often recur with violence when partially subdued. Hence it was necessary in all cases, without much reference to contingent circumstances, to pursue an active system of depletion. General blood-letting was indispensable, and it was often necessary to repeat the operation several times, and that in rapid succession. When a sufficient impression was made by this means, leeching and cupping came in with great advantage, and blisters to the neck and head,—the hair having been removed as soon as the brain was obviously diseased. I found ice, also, a useful topical application. I exhibited calomel freely, either in large or small doses, according to particular indications, some of which were especially derived from the state of the liver and bowels, the former being always congested in these cerebral affections. Hence, also, blisters over the abdomen were powerful auxiliaries. Every substance in which opium was an ingredient aggra-

vated the whole train of symptoms. The warm bath, not exceeding 98 degrees, was useful after the vascular action was subdued. Antimonials and ipecacuanha were excellent alteratives in small doses, frequently repeated. Rest and darkness promoted the good effect of every other remedy.

Relapses of the asphyxiated form of the disease were less common than has been generally represented; and I am happy to bear my testimony to the correctness of the opinion expressed by the medical council, that "a second attack was not to be expected." This opinion has been censured; and doubtless, it was not sufficiently qualified. Cholera Asphyxia has been known to affect the same subject twice in quick succession, but this is a very rare occurrence. What are denominated relapses may be thus explained. A patient is treated for the premonitory diarrhœa, or for some other condition of local disease, which may have been supposed to announce the existence of Cholera, in what has been called its forming stage; and he is soon relieved by his medical attendant. Subsequent exposures develope the constitutional disease, and this man is said to have a second attack of Cholera. Or another patient is restored from the collapsed disease, and the same exposure subjects him to the most formidable congestions of the abdominal organs, or of the brain, and this subject perhaps is said to have died of a second attack of Cholera, or of typhus fever. It is even a matter of pride with the unreflecting, to boast of their recovery from a second attack; which is found on inquiry to have consisted of some loose-

ness of the bowels, or a very natural ejection of some irritating food from the stomach. In this manner has arisen the common impression, that second attacks of Cholera are not infrequent.

It seems almost superfluous to advert to the *Diagnosis* of this disease. If it possess no unvarying characteristic, it may be always distinguished by the uniform presence of some combination of symptoms that is strictly pathognomonic. It is constantly confounded with every species of diarrhœa, from the assumption that a common antecedent affection of the bowels is an integral part of the subsequent collapse; but none are so blind as not to distinguish the period of constitutional invasion. Even the active operation of a cathartic has subjected many a worthy citizen to the distinction of being a recovered subject of Cholera. Still it is better to inflict on the hapless "cholerine" all the pains and penalties that can arise from cataplasms to burning alcohol, than permit his diarrhœa to persevere. When this disturbance of the bowels has proceeded from atmospheric influence, I think the patient is more regardless of his health, than when it arises from other causes.

Ordinary cholera morbus is less frequently mistaken for Asphyxia, than the latter is confounded with "premonitory diarrhœa." Their specific difference is easily distinguished.

The spasms in hysteria are more like the clonic movements of the muscles in Cholera than those of any other disease; and the coincident sinking

of the pulse, which often occurs in either affection from the influence of the spasm, renders a mistake possible. The milder disease always excites great consternation during the prevalence of Cholera.

I have seen the operation of a drastic cathartic result immediately in Asphyxiated Cholera. In such instances, the patient is ignorant of his situation, and awaits the further operation of his ill-directed dose, until beyond all antidote.

Post mortem appearances. You will have seen from the cases which I have heretofore transmitted to you, that there exists a very great variety in regard to the appearances which are observed on dissection. More recent observation justifies the statement which I made you on this subject; but as that was very general, I shall pursue the original plan of this letter of representing the appearances more in detail. I may now premise, that I never detected any other remarkable degeneration arising from this disease, than what I have noticed as existing in the alimentary canal, and the flabbiness of the heart.

External appearances. There was entirely less tendency to decomposition in the subjects of Cholera in this city, than in Asia; and thus far the coincidence is more with the European disease,—a circumstance which may lead us to ascribe something to the influence of tropical heat. I think, too, that the evidences of such change as did occur, were as strongly denoted immediately, as a few hours after death; but rather consisted of partial disorganization arising from morbid

action, than from the operation of chemical laws. Even the flatus in the bowels was not particularly offensive, till six or more hours after death. It should be stated, however, that our season has been unusually cool, and probably, therefore, the phenomena of early decomposition, which were noticed in the East, were here delayed by the operation of that cause.

The body was generally rigid, and always so if spasms were among the last symptoms,—the extremities, particularly the arms, being sometimes in a contorted position. The general surface was often warmer for a few hours after death, than when the patient expired. The skin, on the superior part of the body, usually retained more or less of the colour, which had constituted one of the symptoms. Sometimes, however, it would disappear soon after death, and in an hour or so return in varying shades. It was commonly most remarkable on the face, scrotum, and hands. At other times it would soon vanish not to return; or if the skin had not been discoloured during life, it would generally remain so after death,—or in other instances a general lividness, or patches of blue or brown, would ensue. The corrugation of the fingers remained, though less distinctly. The square form, which I have noticed, was partially lost in a more withered appearance. There was no remarkable shrinking of other parts of the extremities. The parietes of the abdomen were sometimes contracted, and sometimes inflated;—but more generally natu-

ral. The features were more shrunken than in life.

The *Eye* was often lustrous soon after death, and commonly turned upwards. It very rarely exhibited the *film* described by Eastern writers.

The *Teeth* and *Lips* were frequently covered with sordes, and the *Tongue* often became opalescent after death. At other times they were natural.

The *Muscles* were generally firm, and more florid, as soon as divided, than any other part.

Abdomen. The stomach and intestines were often inflated immediately after death. Again there was nothing remarkable, in this respect, at many subsequent hours, and they were seldom in a collapsed state.

Stomach. The exterior of the organ was generally natural. I never saw it contracted, even at its orifices. The serous tissue sometimes presented a blush of redness, or it was occasionally more distinct in patches. The larger vessels were not often injected. The mucous coat was frequently florid at one or both extremities, or the redness occurred in spots of various shades from a crimson to a deep purple or black. These appearances occurred chiefly in the intemperate, and were rare in those of good habits. Sometimes the membrane was unnaturally white, but not blanched as in the large intestines. It was frequently corrugated, but rarely if ever thickened or softened in its texture. The mucus was

seldom natural, and not often superabundant. In a pathological sense, its appearance was entirely the most important phenomenon attending the organ. It was about the consistence of cream, of a grayish white, and more analogous to that substance than to ordinary mucus. It generally adhered to the surface, or when more abundant, was intermixed with the other contents of the stomach. I never observed an appearance of mucous follicles. Among the contents of the organ were frequently found some of the solid ingesta, and there was generally more or less of a fluid similar to that which had been ejected. Bile was sometimes observed, but it was a post mortem occurrence, where it had not been vomited. I have made no experiments to ascertain the presence of an acid here, or in the intestines.

Small Intestines. The organs generally denoted some morbid vascular action. The usual colour presented on opening the abdomen was pinkish, a lake red, and sometimes florid. This colour existed most conspicuously in the inferior portion, and gradually diminished as we ascended to the duodenum. It terminated abruptly at both extremities, in most instances. If it resided in the serous membrane, it appeared not to exist in the minute ramifications of the vessels, and seemed to be restricted to the venous system. But in a great majority of cases the serous tissue was natural, and the discolouration was in the membranes beneath. I never saw the mus-

cular coat contracted. The mucous tissue, and the connecting cellular substance, embraced, in most instances, the vascular fulness, which appeared to be generally limited to the veins. Some times, however, the injection was very minute, and a florid redness extended over the whole surface of the membrane, here and there increasing in brightness. It often resided chiefly in the cellular tissue beneath.

Again no trace of colour could be detected beyond the serous tissue, or more rarely it was absent in both. The degrees of colour, evidently, often depended on the duration of disease, the extent of the evacuation, and the time of examination; but it was much less connected with the habits of the patient than similar appearances in the stomach. I never saw the small intestines blanched. The villous coat was frequently softened in texture, which sometimes extended also to the serous, and the former occurred when there was no fulness of its vessels. In a great proportion of cases, however, there was no such change. The membrane was rarely thickened. The valvulæ conniventes were sometimes more than naturally prominent, and gave to the membrane an appearance of intumescence. The coats were often easily detached from each other, and constituted a pathologiac appearance, which might happen when firm in their texture. The glands of Brunner and of Peyer, especially the former, were often observed, and they sometimes studded the membrane. They abounded most where vas-

cular action was most obvious, and were generally florid. The mucus was more abundant than in the stomach, and adhered to its membrane; or it sometimes existed in a very preternatural quantity, and was then intermixed with the other contents. It was usually of the consistence of cream, and still more like that substance than was the mucus of the stomach.

The contents of these organs varied in appearance, and were not always similar to the dejections. They commonly resembled the notorious "rice water," or oat meal gruel. We did not often find the thick opaque substance filling the canal as described by Christie and some others. Sometimes there appeared to be a mixture of the creamy mucus with the more fluid contents, and the flocculi, noticed during life, were often abundant. I have seen the whole tract of the small intestines filled with a deep yellow fluid, when none of it existed in the large intestines. It was not unusual to observe traces of bile in the duodenum, which had evidently exuded or had been pressed into that division of the intestines after death. The intestines had a doughy feeling.

Large Intestines. In these organs we had a far greater variety in appearances, from a pinkish hue, to a whiteness which arises from long maceration. These appearances were greatly influenced by the extent of the evacuations, and the duration of disease. There were observed the various gradations between those extremes, but the prevailing was a blanched appearance. At other times the whole

extent of the organ was natural as in health, and some slight change in the mucus was the only circumstance denoting morbid action. When any redness existed, it was generally in the cellular tissue, but red patches were occasionally noticed on the villous coat. The cæcum was not particularly the seat of appearances,that did not generally exist in the other divisions. The mucus was least abundant when the membrane was most blanched, and it generally partook of the character of that which existed in the smaller organs. The follicles were not often enlarged, and when so, I commonly thought that it was owing to chronic diarrhœa. The texture of the membranes was rarely softened. Contractions were occasionally observed, affecting the entire tract of these organs, or only particular portions, especially the arch of the colon. They were always very remarkable in degree, sometimes scarcely admitting the finger. Intussusceptions were rarely observed. The contents were generally watery, of a light colour, sometimes brown; and again of a consistence like cream.

There often existed on the serous membrane of the intestines a transparent, glutinous fluid.

There was generally a characteristic appearance of the abdominal viscera, in situ, in Cholera subjects; which chiefly consisted in the contrast of colours that resided in the two great divisions of the intestines.

Liver. No organ was less uniform in its aspect. It sometimes exhibited the appearance

of a mass of clotted blood, and again it was as natural as in health. Between these extremes various gradations occurred, and it was not unusual for one lobe to appear more discoloured than another. Its serous coat exhibited no mark of disease. Organic lesions were seen in the intemperate, but evidently of antecedent origin. They did not appear to influence the determination of blood to this organ. The most remarkable and uniform appearance, on making incisions into its substance, was the absence of bile,—frequently scarcely a trace being observed. It was sometimes gorged with blood, but more commonly contained its natural quantity, or sometimes appeared exhausted of that fluid. The vesicle always contained a considerable quantity of bile, generally about an ounce and a half or two ounces, sometimes not half that quantity, but often was rather distended. The colour varied much, the most prevailing being a greenish yellow,—the extremes being black and yellow. Its consistence was generally natural. The vesicle showed no mark of disease in its mucous membrane. Gall stones were not common, but were sometimes observed. It rarely happened that the bile would not flow freely into the duodenum on compressing the vesicle, or that a probe might not be passed through the ducts.

Pancreas natural.

Spleen generally very natural, but sometimes gorged with blood.

Kidneys natural, their papillæ often affording

small quantities of a fluid like semi-purulent matter. They sometimes exhibited a plethoric appearance.

Bladder, generally empty, and very much contracted. In a few instances it was found to contain a natural urine, to the amount of six or eight ounces. Sometimes a small quantity of a semi-purulent-like fluid was found in its cavity. Its lining membrane was generally natural, but sometimes injected.

Epiploon generally exhibited a fulness of its veins, but no minute injection.

Mesocolon and *Mesentery* had their veins more or less injected in most subjects, depending in some degree on the position of the body subsequent to death, and the time of dissection; as there was reason to think that the blood had sometimes returned to the larger branches of the vena portæ.

Thorax. There was nothing uniform in the appearances in this cavity. Sometimes the lungs were found occupying the full extent of it, or half collapsed, or compressed into a withered appearance. When their volume was thus remarkably diminished, it would have seemed almost the indispensable result of some mechanical cause, had it not been otherwise determined by experiments in the East. It was a pathologiac appearance which involves an interesting inquiry. When their structure was affected, it was from antecedent disease. In respect to vascular fulness, appearances were similar and equally as various

as in the liver, being sometimes surcharged with blood, and then again through all the intermediate gradations to a state of almost entire exhaustion. A plethoric state was sometimes attended with an abundant production of a fluid within the bronchiæ.

The *Heart* and *Blood-vessels.* The *heart* presented no other unusual change than a frequent softening of its texture, by which it acquired a flabby feeling and appearance. Dark patches were sometimes seen on its surface. These were pathologiac conditions evincing something more than impaired nervous energy. The organ was rarely injected, even when the purple patches appeared. Its cavities were often full; or were sometimes entirely empty; or the right cavities were filled and the left empty; or more commonly, a smaller quantity was found in both ventricles. The blood was equally dark in all the cavities. If the ventricles were empty, it did not follow, that the blood was found in the venæ cavæ, though sometimes considerably accumulated here; but at others, they were empty, and it was then obvious, that the blood had been arrested in one or more of the great viscera. When there was blood in the left cavities of the heart, it did not extend far into the blood vessels. Even the aorta contained but small quantities, and its subdivisions were empty,—generally not even stained with blood.

The *Pericardium* was natural.

There was no effusion in the cavity of the thorax.

I have already explained the appearances of the blood, and shall therefore avoid the repetition.

Brain. In about three fourths of the cases, this organ has presented a vascular fulness of its membranes. The great sinuses and the veins of the dura mater were often gorged, and the pia mater was so minutely injected, as to have exhibited, in some places, an appearance of extravasation, which indeed might have existed. Again there was observed a fulness of the vessels in one membrane and not in the other, or only partial discolourations; or, in many instances they were perfectly natural, or even deficient in blood. It was not unusual to observe a fluid beneath the arachnoid, sometimes rather abundant, but generally small in quantity. The brain was sometimes moist, and in respect to consistence, about the same varieties occurred as in subjects of other diseases. On dividing its substance, blood would sometimes appear in small dots, and more abundantly when expressed. But I could rarely perceive that this was a pathologiac appearance. I never remarked any unusual appearance in the complex parts of the organ. The ventricles frequently contained a preternatural quantity of fluid, and were often dry. The plexus was generally natural, but sometimes full. I never discovered any thing worth recording in the cerebellum. The pons was natural, and the basilary

artery contained black blood. The nerves were natural. As far as my knowledge extends, the spinal marrow exhibited no other evidence of disease than a fulness of the exterior vessels. The ganglia were not found to present more than, occasionally, a slight redness.

On looking over the preceding remarks, I find that repetitions often occur; but they were unavoidable in a detail of symptoms, succeeding to a general description of the disease.

Very respectfully, &c.

PATHOLOGIAC VARIETIES OF CHOLERA.

LETTER VII.

New-York, *July 3d*, 1832.

Dear Sir,

The reports respecting the existence of Cholera in this city are so contradictory, that you may be desirous of knowing the absolute truth; but I am chiefly induced to make you this communication for the purpose of submitting to you the morbid appearances on dissecting two individuals who were supposed to have died of this disease, and the notes of which I took during the examination, which was conducted by Drs. Carroll and Ludlow, and myself.

The subject of the first case is the man who lived at the corner of Reed and Greenwich streets. I did not see him till about twenty minutes after death, and have derived my knowledge of his symptoms from his wife and his physician.

He was forty years of age, very robust and cor-

pulent—pursuing the trade of piano-forte making —of intemperate habits, and had drank rather excessively on Sunday, the 1st instant, though was sober enough to accompany his wife to church in the evening. He had complained of a sense of tightness about the region of the stomach, for four or five days previously, but at no time of pain in his head, before or during the disease. His appetite remained good till the noon of that day, when he ate moderately of fried fish and potatoes. Soon after his return from church, he retired to bed, remarking to his wife that he had an unusual commotion in his bowels, which occasionally interrupted his sleep till twelve o'clock, when he first suffered the attack of vomiting and purging, attended by great distress in the abdomen.

The house was immediately deserted by the other occupants, and no messenger could be obtained by his wife, to procure a physician, till five o'clock in the morning, at which time the patient was visited by Dr. Cameron. The doctor informs me that he found him violently affected with vomiting, purging, and most convulsive spasms; the features sunken and the eyes staring; the pulse insensible at the wrist, and the surface cold, and covered with a clammy sweat; the countenance black and terrific; tongue of a dark purple during the spasms, becoming opalescent as the spasmodic action abated; the fluid rejected was watery, consisting probably of the liquids he was permitted to drink; his dejections

resembled rice water, of the consistence of cream. The faculties of his mind were unimpaired to the last, and during the short intervals of ease, his muscular strength was not sensibly diminished. He passed no water after the arrival of the physician.

Small quantities of laudanum were administered, and the usual external applications made, with the effect of diminishing the symptoms generally for two or three hours, at which time reaction began to take place, and at ten o'clock he was bled to the extent of ten or twelve ounces. The symptoms, however, had been again increasing, and continued to become more violent till the time of his death, which took place about eleven o'clock, the patient having suffered about eleven hours.

The lividness disappeared from his skin about half an hour before death, and returned, particularly to the face, about an hour after death.

I first saw him about twenty or thirty minutes after he had expired. The features had recovered from their contraction, and with the exception of the eye, presented no unusual aspect. But the eye was remarkably expressive of that influence which the disease has been supposed to exert on the nervous system; and its wild, glaring stare was startling to the spectator. It was looking forward, and was much exposed by the contraction of the eyelids.

The muscles of the body were rather rigid, and the surface very cold. Spasmodic contractions of the lower extremities were still taking place; and

I am informed by Dr. Cameron, that the legs continued to move occasionally for an hour and a half after his death. The tongue and inside of the lips exhibited a dead white, with a slight shade of blue. This colour was independent of the coating, which did not exist to any remarkable extent. There were several livid patches on the thorax and shoulders.

The dissection was commenced in about an hour and three quarters after death. At this time the face had again become very livid, and the skin was discoloured extensively in other parts. The eye retained its remarkable wildness, much of which was remaining four hours afterwards, when we finished the dissection. The muscles still slightly rigid, but no spasmodic motion could now be observed. The incision penetrated about three fourths of an inch of cutaneous fat, and I was surprised to find the muscles so florid in a case of so much obvious congestion.

On opening the abdomen, the stomach and large intestines appeared very much inflated; the small intestines only partially so. The stomach and small intestines were florid, denoting great vascularity of the internal coat. Large intestines natural. Mesentery and omentum loaded with fat. No turgescence of their veins, or of the veins of the diaphragm. No fluid in the cavity.

The stomach contained a pint of a fluid resembling a weak infusion of coffee. A bright redness existed in the upper portion of the stomach, occupying about one third of the organ, and terminating

abruptly near the cardiac orifice. All the inferior portion was slightly livid, and, at the pyloric orifice, a livid redness began abruptly, and extended through the whole tract of the small intestines.

In the large intestines, the mucous membrane was natural. A large quantity of a fluid, resembling oatmeal gruel, and of a shade between that and rice water, existed throughout the intestinal canal. There was rather more than the usual quantity of mucus, resembling cream, though not so white.

Liver externally natural—perhaps rather lighter than usual; on making incisions, the black blood flowed more freely than in a healthy state of this organ. The gall bladder contained about an ounce of black bile. The ducts perfectly natural, the bile flowing freely through them. Spleen and pancreas natural. Bladder empty, but not particularly contracted. The veins of the right auricle of the heart rather fuller than usual. No turgescence of the coronary veins. Lungs blue, and turgid with black blood to a very remarkable degree. Cavities of the heart and venæ cavæ entirely empty. No fluid in the thorax. Brain engorged with black blood, and the ventricles contained four or five ounces of serum. We were not permitted to examine the ganglia and spinal marrow.

Case 2. We immediately proceeded to examine the case of Betsey, the black girl, who resided as cook at Mr. Thomas', No. 185 Reed-street, about twenty rods from the house of Mr. G., and where

she had lived for several months. Betsey was very temperate and regular in her habits, but a large feeder—of slender frame, but capable of her duties, and generally enjoyed good health; about twenty years of age. She attended church in the afternoon of Sunday, the 1st instant, and made no complaint till six o'clock of that evening, when she felt some sickness and pain at her stomach, and went to bed. At two o'clock, A. M., the family were awakened by her groans. The morning after the examination, I received from her attendants the following account of her symptoms:—She was found stiff with the cramp, and severely affected with vomiting and purging; complained of great distress over the whole body; eyes staring and sunken, and the features contracted. Fifteen drops of laudanum and a little camphor were given, which removed the vomiting in a few minutes. The same dose was repeated in an hour after. The purging, however, continued, and the spasms constantly recurred, attended by great suffering. Profuse sweating took place towards morning, when the surface became rather warmer. At eleven o'clock, she began to sleep, and was then left by her attendants till four o'clock, at which time she was found dying.

The fluid vomited and dejected is said to have resembled rice water. She had no physician. In the progress of the disease, a dose of salts was given, and occasionally wine and water.

The dissection was commenced at fifteen or twenty minutes after death. Every muscle was violently

contracted, and remained so, without any motion, however, for an hour and a half, when the examination was finished. Skin livid, and petechiæ numerously distributed, appearing with great distinctness on the schlerotic coat of the eye. Features rather sunken; expression of the eye remarkably wild and glaring, corresponding exactly with this appearance in the other case. The eyes were also very much exposed, and turned upwards.

The stomach and large intestines externally natural, and free from flatus. Small intestines livid. Veins of the omentum and mesentery more than usually full. Mucous coat of the stomach slightly discoloured; scarcely a morbid appearance. This organ contained a small quantity of a fluid resembling rice water. The lividness of the small intestines existed in the serous membrane, the mucous coat being natural. These organs contained a considerable quantity of a yellow fluid. The large intestines were filled with a fluid exactly resembling rice water, with flocculi like "half-dissolved flakes of snow." Mucous membrane natural. The mucus, which resembled a creamy substance, did not exceed the natural quantity.

Liver very purple—the left lobe in a plethoric state, and the right lobe very turgid, with black blood. The gall bladder contained about an ounce of yellow bile. The ducts perfectly natural. Spleen and pancreas natural. Urinary bladder contracted to a small, hard knot, evi-

dently owing to the spasm. No fluid in the cavity of the abdomen. The lungs were found in a perfectly natural state. The heart was engorged with black blood, as were also the venæ cavæ. No fluid in the thorax. We were too much fatigued to enter on the examination of the brain, &c.

JULY 4.—Cases of this disease are now constantly occurring, and it attacks all ages from infancy. The symptoms are uniformly such as I have described. Dr. Bliss informed me to-day that he witnessed the dissection of a child, in which the morbid appearances were exactly such as I have described in Betsey's case. The invasion is very sudden, and without any premonitory symptoms. I believe some have recovered. They generally die in about twelve hours from the attack. It has now appeared in almost every part of the city, and no one thinks of tracing it to contagion. The vomiting is easily allayed by small doses of laudanum. The spasms are obstinate. The collapse is immediate, and no reaction takes place. In short, it is death at the very invasion. The probable number of deaths to this time, six P. M., is from thirty to forty.

Very respectfully, &c.

LETTER VIII.

NEW-YORK, *August 15th*, 1832.

DEAR SIR,

I have just attended an examination of one of the most malignant cases of Cholera Asphyxia that I have yet witnessed; and perhaps you may be interested with an account of the morbid appearances.

The subject was a very robust sailor, about forty years of age, and of intemperate habits. He was attacked with vomiting and purging on the evening of the 12th inst., and was found in a shed on the following morning, from whence he was taken to the Park Hospital, where he died in a very short time. The purging was now slight, but the vomiting and spasms were excessively severe. He had, also, the other characteristic symptoms of the disease in a prominent degree. Almost the entire surface of his body was nearly black.

The examination was commenced about ten hours after death. The surface of the body still retained its blackish hue, and the muscles, as is common, were very rigid. As their substance was divided, we observed the redness which they usually present in this disease, which contrasts

very strongly with the blood in the larger arteries. The stomach was unusually capacious and rather florid. The small intestines were of a dull pinkish hue, which became less obvious in the larger. These organs were all inflated, but nowhere contracted. The veins of the omentum and mesentery were fuller than in the natural subject, and there was an obvious determination of blood to these viscera. The stomach contained about three gills of a fluid similar to the contents of the gall bladder, which had evidently exuded from the liver since the death of the subject, as the fluid vomited exhibited the appearance of rice water to the last moment of life. There were florid patches distributed on the mucous membrane, and its veins were fuller than natural. But I have generally seen these appearances only in the intemperate. I examined the texture of this membrane through the alimentary canal, and we were satisfied that it was not softened, or in any respect disorganized, the reverse of which, however, I have observed in cases of apparently much less malignancy. The pyloric orifice was in a healthy state, as was also the cardiac. The mucus was natural in appearance and quantity, and equally so in the intestines. The mucous coat of the small intestines was fully injected, and the blood florid, appearing more like inflammation than congestion; though certainly not active inflammation. The large intestines were hardly in a pathologiac state, and manifested no particular vascularity at the caput coli. These organs contained a light-coloured

fluid. The liver was unusually large, of a hardened texture, very natural in colour, and containing rather less than its natural quantity of blood. The gall bladder was full of a greenish yellow fluid, and its ducts entirely pervious. The kidneys, spleen, and pancreas, natural. The bladder moderately contracted, and containing more than half an ounce of a fluid resembling thin pus. The lining membrane was morbidly vascular, of a bluish appearance, but we could not detect any evidence of gonorrhœa. The veins of the diaphragm were not full. The lungs filled the cavity of the thorax. (We frequently find them very much contracted and empty.) They were black and greatly engorged with blood. There exuded from the incisions a large quantity of a mucoserous fluid. Their structure was healthy. The heart was natural, and contained in both ventricles black blood. The large arteries remote from the heart, as is common in our examinations, were entirely empty, not even stained with blood. There was no effusion in the thorax, or other cavities. The brain, quite unexpectedly to us, exhibited the most perfect appearance of health. Its blood was not even so much discoloured as in other organs, and there was no more than its natural proportion. There was no effusion under the membranes, and the ventricles were only moist.

Very respectfully, &c.

LETTER IX.

NEW-YORK, *August 30th*, 1832.

DEAR SIR,

I ATTENDED this morning—at the Crosby-street Hospital, through the politeness of Dr. Rhinelander, who has the charge of that institution, and where I have before witnessed very interesting dissections—the post-mortem examination of two subjects who died of Cholera, and whose cases I communicate to you, for the purpose of announcing, if I am not mistaken, the discovery at that hospital of an oil existing in a free state in the blood. I have not seen this circumstance noticed by any writer; or if so, I have forgotten the fact. Dr. Gale, the chemist employed by Dr. Rhinelander, is the gentleman who first observed this phenomenon, and who has witnessed it in many instances. He has obligingly furnished me with his notes on the subject, which I shall append to the cases. Perhaps, too, you may derive some interest from the novelty of one of the patients having been transfused.

A. B., an athletic negro, aged about forty years, employed as a sailor, and of intemperate habits, was admitted, on the morning of the 29th, with the usual phenomena of Malignant Cholera. Vomiting and purging had occurred to a large extent. He died at three o'clock in the afternoon, and the dissection was commenced about eighteen hours after death. There was nothing remarkable in the external appearance of the body. The muscular substance presented the usual florid appearance. No sensible decomposition had taken place. The veins of the epiploon and mesentery more than naturally full. Small intestines of a pinkish colour; large intestines nearly natural—not blanched; caput coli natural. These organs had a glutinous fluid on their exterior, which is often observed. The mucous tissue of the small intestines rather florid, but not minutely injected—the blood evidently existing in the veins; its texture firm, but not very grumous; the quantity of mucus natural, but creamy. The contents of the whole tract consisted of a large quantity of a fluid resembling oatmeal gruel. There was nothing unusual appertaining to the large intestines. The liver was very natural, and the gall bladder about half full of a light-coloured bile, which escaped, on pressure, into the duodenum. There were also found three gall stones, of the size of a pea, in the duct. Bladder contracted, and containing about two drachms of a turbid yellowish fluid; quite vascular at its posterior part. Kidneys

very large, but natural; a semi-purulent fluid oozed from the papillæ. Spleen flabby, and full of blood. Pancreas natural. The anterior portion of the lungs contained more than the natural proportion of blood, and the posterior still more—making a proper deduction for the position of the subject. The lungs otherwise healthy. The heart in all its cavities, and the large vessels, contained a considerable quantity of black blood. The substance of the heart was soft and flabby, otherwise natural. Numerous masses of firm coagulable lymph were found in this organ, and in the aorta at its origin—a circumstance which frequently occurs, even when dissections are made soon after death.

No fluid in any of the cavities.

The brain was perfectly natural—no fulness of its veins—perhaps rather less serum than should have existed. The arteries, as usual in choleric subjects, contained black blood. The par vagum and other nerves very natural.

The oil, to which I have adverted, was remarkably abundant in this subject. It covered the blood from whatever part abstracted, and floated in small and large globules on the surface of about one ounce, after standing an hour in a vessel, into which it had been received from the heart. There were two globules of the size of a common pea; the others were very numerous, but no larger than a grain of mustard. It was found in the large and small vessels—it was very distinct in the brain—it was as obvious in the kidneys, and

in every part particularly examined. It resembles olive oil in appearance and consistence.

Case 2.—The subject of this case was a white man, aged thirty-five years, a labourer, and intemperate. He was admitted in the forenoon of the 29th inst., and died at eight o'clock in the evening. His symptoms were very malignant, and presented a good specimen of the Asiatic Cholera. He was transfused, five hours before death, with forty ounces of the common saline preparation. Dissection began fifteen hours after death. No particular evidence of decomposition. Body still quite livid. Muscles more than usually florid. Large veins of the abdominal viscera rather fuller than natural. The omentum more than usually vascular and florid. The stomach externally and internally natural—no fulness of its vessels, and no softening of the mucous tissue. Small intestines of a light blush of redness, but scarcely pathologiac; inner membrane rather more than naturally vascular, and the blood existing in the extreme vessels; its texture firm, and distributed on its surface were numerous enlarged follicles. The mucus here, as in the continuous organs natural in quantity, and of a creamy consistence and appearance. Large intestines perfectly natural. These organs were much inflated, and contained a large quantity of a light-coloured fluid, intermixed with a pultaceous substance. Their surface was covered with a transparent glutinous fluid. In the stomach were found several large pieces of pickled cucumber, which had been

swallowed without mastication. In the large intestines, as also in the other subject, the mucous tissue was easily detached, by pulling, from the serous. Not so in the small intestines. I have often remarked this circumstance in other subjects, and have found it existing in the small intestines. The liver was natural, and the gall bladder distended with black bile, which was easily expressed into the duodenum. The kidneys natural, and the same muco-purulent fluid as in the other case exuded from the papillæ in a small quantity. Spleen and pancreas natural. The bladder was not contracted, and it contained half a pint of a light straw coloured urine. This is the first instance in which I have found more than half an ounce of that fluid. The lungs, posteriorly, were gorged with black blood; their structure healthy. The cavities of the heart and large vessels contained rather a large quantity of *black* blood, in which were discovered large concrete masses of coagulable lymph—some of them in the aorta, and some in the pulmonary artery. The substance of the heart was soft and flabby, and a few purple patches were observed on its surface—an appearance which is not common with us. The brain was in all respects natural; its consistence usual; the blood-vessels not half filled; but there was more than half an ounce of serum in the ventricles.

In this subject the free oil was seen floating on the blood which was taken from the heart, from the kidneys, the brain, &c.; but in less remarka-

ble quantities than in the former case. I could perceive no difference in the colour of the blood of this injected subject, from what occurs in all cholerics, excepting in the minute vessels of the membraceous organs, and in the brain, where it was more florid. I think, also, the fluidity was greater, although the quantity transfused was not large.

In an unfinished letter to you, I have adverted to the dissection of another transfused subject, in which the appearances are nearly coincident with this case.

The following is the statement referred to from Dr. Gale:—

Dr. M. Paine,

Dear Sir,—Your request concerning the oily matter which I have noticed in the blood, I am happy to gratify, as far as I am able. The oily matter referred to above, is not that described by Lecanu, as discovered by Schwilgué. The former is obtained by solution of the solids contained in the blood, in alcohol; the latter is found floating on the surface of the blood when taken from the body. The proportions vary with the stage of the disease, increasing as it is more advanced. Indeed, I have scarcely found any appreciable amount in patients that were not in a stage of collapse. It is greater after death than the usual increased proportion would furnish; or in other words, the proportion is a constantly increasing one. The case you saw here last, I think, is a fair

sample exhibited by post mortem examinations. The portion of the oily matter in eight cases has been from one half to two per cent., which is the greatest proportion I have seen in any case.

The matter above mentioned, I believe, has not been described by any writer on the subject; and though I have by no means found it in all the patients examined, and from whom I have taken cholera blood, yet in every case, except one, of post mortem examination, I have perceived the oily matter, sooner or later, floating on the surface of the blood.

I have not yet ascertained whether it be a peculiar principle, or whether it be only the same as that described by Lecanu. I shall examine this matter as soon as I find leisure.

Respectfully yours, L. D. GALE.

The case alluded to as "a fair sample," is that of the sailor. The blood was rather more than usually abundant in the heart and large vessels, of diminished fluidity, and very dark in the arterial system.

Very respectfully, &c

LETTER X.

New-York, *September 5th*, 1832.

Dear Sir,

I have endeavoured to communicate to you hitherto, such of the cases of Cholera Asphyxia, in which I have made or have witnessed post mortem examinations, as should best illustrate the pathologiac varieties which occur in that disease. Parallel cases would but encumber the Journal in which you have done me the honour of making the publication, and would afford no interest to yourself from the multiplicity which are now on record.

Through the continued politeness of my friend, Dr. Rhinelander, I assisted in the dissection of a subject at the Crosby-street Hospital this morning, whose case adds to the variety of morbid appearances which have fallen under my observation.

The subject was a labourer, about forty-five years of age, and his habits generally temperate. He was admitted yesterday in the stage of collapse; and after suffering severely the usual cha-

racteristic symptoms, died in the evening. The examination began about twelve hours after death. Surface natural, features contracted, muscles rigid, abdomen tumid. Stomach and small intestines inflated, the latter more than usually florid. Veins of the epiploon and mesentery full. Peritoneal investment adhesive to the touch. Mucous membrane of the stomach natural, of the small intestines slightly vascular, but the redness existed principally in the serous tissue. As is common in Cholera subjects, where redness of the small intestines occurs, it abounded most in the ilium. There was little else in the canal than a cream-like mucus, which was found in a preternatural quantity, but adhering to the membrane. The large intestines were contracted through their whole extent to about two thirds of an inch in diameter. The cœcum was also contracted in a corresponding degree. They of course presented a knotted appearance. The colour was healthy, and in every other respect they were perfectly natural. They contained nothing but mucus, less abundant than in the smaller portion, but very similar in sensible properties. This is the second instance only in which I have observed a contraction of the large intestines. The former I noticed in a subject at the Bellevue Hospital, and in that case the contraction was confined to the arch of the colon. This portion of the intestines is commonly found inflated—very rarely

contracted. The liver was unusually pale, and no blood flowed from deep incisions. It could only be expressed from its largest veins. We could not detect a trace of bile in the organ; it was otherwise healthy. The gall bladder contained about an ounce of yellowish bile—apparently two thirds filled. Urinary bladder entirely contracted. The other abdominal viscera natural. In the thorax, the lungs were very natural, and about two thirds exhausted of air. The left cavities of the heart were perfectly empty and natural; the right contained a moderate quantity of blood, and were morbidly flabby. No petechiæ. Serous tissues of the parietes natural.

Dr. Rhinelander made a very minute dissection of the brain. It was rather more than usually soft, and its organization was distinct, and exhibited in a very interesting manner by Dr. R. The membranes were natural, and their veins contained less blood than is commonly found in subjects who have died of other diseases. The nerves, in their origin and extension, showed no mark of disease, nor could any be detected in the cerebral substance. A little florid blood exuded on the surface of the medullary portion. The ventricles contained their proper quantity of fluid, and the plexus was natural. The pineal and pituitary glands, and other parts, were found in their natural state. The cerebellum and medulla oblongata were equally free from marks of disease, and the basilary artery was empty.

In this subject, the oil of which I formerly spoke was found in small quantities on the blood, from whatever part examined.

No evidence of decomposition.

Very respectfully, &c.

THE END.